



Logan Keokuk } 100-
 Burlington } 150

Blackland Kinderhook 50-60

Cuyahoga }
 Weekly 40 }
 Base 200- } 240-
 Smiling at face 400 } 440

Berea grit. Cher 50-
C 60

Bedford shale 50

Cleveland shales,) 50

Huron shale

Anderson Co.

557 Soil } John M Walker 1856
558 " } Near Lawrenceburg.
559 Sub } Blue l. formation.

2262. Water. Bored Well. 80 ft deep.
Sent by Henry S Carl.
Lawrenceburg. Oct 2. 1883.

3043. Water. Spring. 1890
James McBrayer's place.
Near Lawrenceburg
Brought by Mr. H. R. Forster.
484. White Oak ridge, rock. Mr. Hall's
farm.

485 Limestone } Leptaena l. on road from
486 " } Alexander Julian to Law-
renceburg.

Bath Co.

804. Soil. Best Hemp soil. $1\frac{1}{2}$ mi SW of
Sharpsburg. Lava Soil. 1861.

809. Soil } Mr. Sudduth's farm. $1\frac{1}{2}$ east
810 Soil } of Sharpsburg. Blue l. 1861.
811 Sub }

Boone Co.

- 565 Soil } Sandford farm. 1856
 566 " } Near Union.
 567 Sub. } Blue limestone.

1697. Clay. 3 mi. West of Burlington,
 sent by W. W. Walton. 1876.
 = SW of Burlington on Burlington
 Bellevue pike. $\frac{1}{3}$ mi before
 reaching Bellevue precinct. ?

Bourbon Co.

- 568 Soil } Capt Wm. P. Humes' farm. 1856
 569 " } On divide betw. Houston +
 570 Sub. } Cooper's creeks. W. or NW of Paris.
 571. Underclay with capax + testud.
 572 Limest. with capax
 573 Shell l.

- 574 Soil } Wm Buckner's farm. 1856
 575 " } Betw. Storer + Hinkston creeks
 576 Sub. } on Cane Ridge. E or NE of Paris.
 577 Underclay Favosites, Lynx, occidentalis
 578 Crystalline l. quarry below woods
 579 Chert l. below woods pasture.

1638. Limest. Cane Ridge. 5 mi. E of
 Paris. Used for foundation
 of Court house at Paris. 1875
 sent by James Stevenson.

822. Magnesian l. Loose slab where soils
 574 & were collected, William
 Buckner. Cane Ridge.

Boyle Co.

580. Soil. Thomas Read's 1856.
woods pasture. 1 mi. from
Danville.

Bracken Co.

823. Salt Water. Big Bracken creek.
Sent by L. G. Bradford. 1861.

824. Sandstone, Mudstone. on road
from Dover to Augusta, Low Sil.
1861.

825 Limest. } Hillside Neoprene. near 1861

826 Soil } Augusta, L. G. Bradford farm

827 Sub.

828 Soil } Near Locust creek. same farm.

829. Soil Dr. J. B. Bradford. Near
Augusta 1861

830. Soil. Clay with Indian bones. near
Augusta. 1861

831 Soil } James Dunnivan farm.

832 " }

Bullitt Co.

587. Marl. from line betw. Bullitt
and Spencer Cos. in
Favosites Beds. 1856

588. Marl. from NE part of Bullitt
Co. Locality practically
unknown. 1856.

494. Magnesian l. on road from
Shepherdsville to Mt
Washington. Low Sil.
Is this correct?

Campbell Co.

0590 Soil } Benjamin Beall's Land.
591 " } Alexandria.
592 Sub } 1856.

1315. Marly Shale. $\frac{1}{4}$ mi. from 1875
Newport. on Alexandria pike.
Between Newport & Bellvue.

01316. Marl from Siliceous Mudstone.
10 ft. from surface.
Gallows Gap. 1875

01320. Sandy Ferruginous clay. 1875
3 ft from surface.
Mt Vernon road, $\frac{1}{2}$ mi from
Alexandria pike.
Reddish brown. glacial?

1321. Ferruginous clay. Glacial?
Side of road, 1 mi. N of Grants
Creek. North head waters of
Philip's creek. A branch 1875.
follows the road north.

1322. Moulding sand. Glacial or
Fairmount? 1875
 $\frac{1}{2}$ mi. NE of Newport Reservoir.
See map

1324. Soil. Gen. G. B. Hodge farm 1875
Flat Woods. Waters of Philip's
Creek. $1\frac{1}{2}$ mi SE of Grants Lick.
A few pebbles of milky quartz.

1325. Same locality as 1324. Also
soil. 1875. About 1 mi nearly S

1326. Same 1327. of Grants Lick P.O.

1327. is said to have siliceous
mudstone beneath. Therefore
1324-1327 may be Fairmount
soils.

1328. Spur of hill 60 feet above
soils 1324-1327. 1875
Same locality as last

1329. Soil. Fort Leys Land. 1875
8 mi from Newport.
Alexandria pike.

1330. Subsoil.
1334. Limestone full of fossils.
1 mi S of Cold Spring P.O.

1331. Soil. with chert. Over mudstone
Upper waters of Pond creek.
near Pond creek P.O. on
new pike. 4 mi SW of Alexan-
dria. Claryville P.O.? 1875

1335. Marly shale. 2 mi S of Newport.
Licking 3 mi creek. 50 ft above
high water mark. 1875

1336. Same locality. Marly shale.
Beds are 30 ft thick. These
come 60 ft above high
water.

Carroll Cr.

593 Soil } Walton Craig's farm. 1856
 594 " } 1/2 mi. from G.hent.
 595 Sub }

Clark Co.

2468. Soil. Level tract in
 W. H. Prewitt farm. on divide
 betw. Hinkston & Gulbeignid
 creeks. On Middle Anderson. 1884.
 Crampish lands.
 876 Magnesian L. Building stone. quarry
 at mouth of Lower Howard cr.
 Lrr. Sil. 1861.
 877. Limestone. Judge Simpson's farm. near
 878 Winchester.
 879 }
 880 }
 881 Soil } Wm R Duncan farm. near
 882 " } the Simpson farm.
 883 Sub }
 500 Soil } Dr. S. D. Martin.
 501 Sub }

Franklin Co.

Fayette Co.

Fleming Co.

972. Marl. greenish + reddish brown.
at junction of Upper + Lower Sil.

978 Sil. Deltayris lynx beds. Mr. Fitz-
979 " Gerald's farm, northern part
780 Sil of Fleming co.

Gallatin Cr.

619 Soil } Near Big Lick creek
620 " } Blue limestone. Soil 1856.

Gardner Cr.

621 Soil } J. S. Hoskins. Forbes of Lake.
622 " } modesta + pellicatella.
623 Sub. } 1856.

624 Soil } W. Smith's farm. 1856.
625 " } Bryantsville.
626 Sub. }

985. Limestone. Upper Silurian. Burdett's knob.

986 Soil } Chas E Spilman 1 mi E of
987 Sub. } Dick's river. on base line.
988 Soil } Chas J. Spilman. 1 mi
989 Sub } E of Dick's river.

Grant Co.

627 Soil } Hayden Kendall's farm 1856
 628 " } 7 mi fr. Williams town
 629 Sub } on Cwington pike.

630 Soil. } Moses Theobald farm,
 631. Mudstone } 5 mi N of Williams-
 town.

990 Marl, alternating with
 limestone. Moses Theobald
 farm.

991 Shale from same as 991.

Harrison Co.

646 Soil } James Miller. 3 mi S of
 647 " } Cynthia.
 648 Sub }

Henry Co.

649 Soil } John Hornback. 1856
 650 " } 2 mi S of New Castle.
 651 Sub. }

1577. Marly Shale. Cut of Cumberland
 + Ohio R.R. Eminence. 1875.

Jefferson Co.

2916. Water. Well. 1900 ft. 1875.
 SE Edmunds.
 W. side of 3rd St. between
 Weissinger + Magnolia Streets
 Louisville Ky.
 St Patrick's Well.

1065. Variegated l. near base of Wp.
 Sil. 3 mi from Middletown
 on Shelbyville road.

1066. Hydraulic l. Chenowick creek,
 Wp. Sil.

1068. Finest Banded building
 stone, 75 ft at we Dean
 Marble. From Madison
 Indiana quarries. Used
 for Court House at Louisville.
 1861

1069. Marl from Chenowick cr.

Kenton Co.

667 Soil } Armstrong's farm. 1856
 668 " } 5 mi. SW. of Covington.
 669 Sub }

2331. Water. Springs. at Big Bend tunnel.
 140 rods from N end of tunnel
 + same distance from Grant's
 Station. 1883.

1581. } Siliceous grit. at first toll gate
 2 mi. from Covington. 1875
 1582 } Same. used for molding sand.

1583. Clay. Lexington pike. 2 mi.
 S of Lexington. just below
 grits 1581 + 1582 which may
 be glacial.

Madison Co.

2059. Mineral water. Well. 750 feet.
 Dr. J. Reed. Began in Dev. Black
 shale, near Paint Lick. 1878.

2210. Water. Well. 126 feet. 1879
 150 ft S of railroad track at
 Clear Creek station. about
 200 ft. W. of Silver Creek, in a
 bottom.

2486. Soil. } William Gibson, near
 2487 Sub. } Richmond, close to
 Lancaster pike. 1884

2488 } ~~Soil. } Steve Walker, near his farm~~
 2489 } ~~Sub. } 200 yds to right of Paint~~
~~Lick pike. Black shale~~

2490 Soil } S. Fitzpatrick.
 2491 Sub } Near Walnut Meadow
 and Big Hill turnpike, 4 mi.
 NW of Berea. Middle And-
 son. 1884.

1123. Magnesian l. on Mr. Covington's
 farm. Where red bed soil was
 collected.

1126. Well. Jones's. Spilman. 18 ft.
 Paint Lick.

1127 } On slopes below junction of
 1128 } Black shale + magnesian
 1129 } limestone. Covington farm
 at Elliott's.

Marion Co.

673 Soil } Daniel Evalhart farm
674 " } 3 mi W of Lebanon.
675 Soil } 1856

Marion Co.
1130 Earthy portion between D.
lynx beds, edge of Marion
and Fleming Cos.
1131 Oxidated part of 1130
1133 Limestone.

1132 Limestone hillside near Dover
1134 Soil } 150 ft above Ohio
1135 Soil } river.
1136 Soil } Near foot of hill side
1136 Sub } near Dover, Longlone
} Talbot land.

Mercer Co.

678 Soil } 4 1/2 mi. SE of Harrods-
679 " } burg.
680 Soil }

681 Soil } Cheteto beds of blue
682 " } limestone near
683 Soil } Cornishville. Over-
684 Under clay lying birds eye
685 Limestone. } limestone me.

1139 to 1147 (1144 = 3 mi W of Harrodsburg)
Vandever farm.

Montgomery Co.

2500 Building stone. 2 ft thick.
Dr. L. C. Jeffries. NW part
County. 60 ft above Adams
run.
2501 Middle Hudson soil near
2502 Sub. Adams run.
2503 Soil
2504 Sub.

2505 Soil. Johna Cwings farm.
2506 Sub. near Mt Sterling & Cwings
ville pike. 6 mi. from
Mt Sterling. Upper Hud-
son, on O. lynx beds.

2507 Soil } app. 2500-2506. in
2508 Sub } Gen. Dick Williams
farm.
see later pages

Nelson Co.

- 714 Soil } Beach camp's land 1856
 715 " } Chaplin creek.
 716 Sub } SW of Ashes creek.
 717 Underlay
 718 " with Otter lynx

- 720 Soil } Gentry farm. near
 721 " } Bloomfield.
 722 Sub } O. lynx.
 723 Shell earth under O. lynx earth.

- 724 Soil } Maj. Minor. Near
 725 " } Bloomfield.

729. Soil. Shell earth. R B Grigby
 3 mi from Bloomfield.
 near head of Swampy creek.

- 2394 Ferrug. l. } S P Stiles farm, 1883
 2395 " " } Cumberland ss + sh.
 2396 Soil } 4 mi. N of Bardstown.

1168. *Favosites stellata*, Bard-
 town. corals itself.

Nicholas Co.

730. ss. & sand + gravel. prob-
 ably glacial. Blue Lick
 Battle Ground. Cedar Hill.
 Near Lower Blue Lick Spgs.

731. Mudstone near Carlisle.
 probably base of middle Eden. Clinton notes.

732. Mudstone. Cut of RR
 near Carlisle. W + SW of
 town.

733. Water. Lower Blue Lick
 Spgs.

- 2068 Lower Blue Lick Spgs.

3221. Water. well. 145 feet. at
 Deering Camp Grounds.
 Parks Hill. ? Paris bed 1893.
 Well begins new top of Nicholas bed.
 (1196. J. M. Turner. Soil.
 Waters of Stanley creek.

- { 1197 Soil
 1198 Sub.

Adelphi Co.

734 Soil } A. Hawley farm.
735 " } Fossiliferous beds at
736 Sub. } junction of Upper + Lower
Sil.

737 Soil Ashy white soil.
7 1 mi. NE of La Grange,
in a hollow. derived from
a sandstone near base
of Upper Silurian.

1201. Limestone. from which ash
soil was derived. 1 mi.
NE of Adham.

1202. Hydraulic. of Currys
Fork. of Floyd's creek.

Green Co.

738 Soil } Green Threlkold farm
739 " } 4 mi. fr. Centon.
740 Sub }

741. Ss. Near Beng. Hardin.

742. Limestone. Nucula sp.
Headwaters of Cedar creek
near Harmony.

1203. Marl or shale. from spring
waters of Dickey's creek.
1 1/2 mi. from Ben. Haydens
farm.

1204. Soil. } After ascending hill from
1205 " } Harmony to Stamping
1206 Sub. } Ground. S edge of
Green Co.

1207. Soil } Weston Jenkins
1208 " } 2 1/2 mi. from New
1209 Sub } Liberty.

Pendleton Cr.

- Pebbles near Cynthia and
Falmouth pike. in Pendleton
Cr. - Glacial?

743 } Soil } Wm Tellis
744 } " } 6 1/2 mi N of Falmouth
745 } Sub }

748 Sr
749
750

Scott Cr.

748 Soil } James F Robinson
749 " } 3/4 mi f. George-
750 Sub } town in Elk Horn
Cr.

1224. Shale, Fly as fork of Big
Eagle creek.

1225 Mudstone from same region.

Shelby Co.

2436. - Soil. Jephtha Knobs, 5 mi.
SE of Shelbyville. Wp. Soil.

2437. - Limestone. Upper Soil.
Jephtha Knobs. 1883.

751. - Marl. Chertites beds.

752 Soil } Addison Jesse's farm.

753 " } Leukis Chertites

754 Sub } Leptaena beds in SE
part of Co.

755 } Soil } Wm Crabster. on Bull-

756 } " } skin Creek. 4 1/2 mi from

757 } Sub } Shelbyville on Louisville
pike.

Spencer Co.

2438. Phosph. l. Lower part of
Upper Hudson River beds
1883.

2439. } Soil. D. B. Wigginton farm.
2 mi N of Fairfield. Upper
2440 } Hudson near top of Lyons beds.
Sub } 1883.

758 Soil } George Beam

759 " } Betw. Beech + Bashear

760 Sub } creeks.

761. Marl in blue limestone.
Near Taylorsville.

Trimble Co.

764 } Soil } Henry Tyris farm
 765 } " } 1/4 mi E of Bedford
 766 } Sub } Over Magnesian
 earthy & cherty beds
 of upper Sil.

1251. Fossil Murchisonias.

164. Marl. like the Conclitic Marble
 of W Dean at Marble Hill,
 On Cedar Creek, at mouth.
 about river.

Washington Co.

770 Soil } Spirifer certus + Leptaena
 771 " } na beds.
 772 Sub } Stephen C Brown.
 Pleasant Grove settle
 ment. A field cleared
 by Gen Walton.
 & C Brown.

773 Soil } Wm Lyntm.
 774 " } SW side of Beech
 775 " } fork of Salt river.
 about Mackville and
 Williamsburg.

Cincinnati, O.

2. p. 375. Ohio. Vol. I.
Blue shale, Brighton Hill.
3. Blue shale, Sycamore St Hill
4. Drab shale " " "
5. Fossiliferous shale " " "

Adams Cr.

- 85.- Peppel. Three miles E of Manchester, on shelving bank of Ohio River. No bluff here. But hills are back of it. During high water the top of 2 mi. pk would be submerged 15-20 ft. = from water level up 20 ft.

- 83-84, From quarry just NW of Manchester which is above ordinary high water but which was submerged 10 ft in 1883.

83 = upper 21 ft Bellevue.

84 = next 12 ft. top of Fairmount

So cut B. & O. way cross the bridge at junction of B. & O. & Adams Cr. bridge.

Richmond beds.

1. p. 374. Vol. I. Ohio.
Lebanon beds. Waynesville.
1. p. 375. Vol. I. Ohio.
Fossiliferous shale. Waynesville.

Montgomery Co.

{ 1148. Swl R Apperson. Not Ster-
1149 " ling 1861. D. Lynx lands
1150 Swl.
1151 Under day

Clinton iron ore at Iron Ridge Wisc.

Wyllyff formation

14. *Certhis* bed at Spring Valley Minn.

(30 ft) *Certhis occidentalis*
Leptaena micantata typical
Rhynchonella anticretionensis.

13. *Leptaena* bed. West of Wyllyff Minn.

(30 ft) *Certhis subquadrata* (10 aler)
Plectambonites recedens Sand. (14 aler)
Rhynchonella palanellora (14 aler)
= *Williamsoni* Ill. fauna.

12. *Certhis* over as bed. Iron ore bed. Iowa.

(25 ft) *Certhis emarginata*
Murchisonia mulleri
Clonadonta calvina
Clidiaspeltis sp.
Certhis over as
Cyrtoceras
Diplograptus
Certhis subquadrata
Certhis subquadrata
Strophomena trilobita (11 aler)
= *flexuosa* Billings (11 aler)

11. *Diplograptus* bed. Draper Minn.

(20 ft) *Asaphus* 3 species.
Pellurapora trilobatus
Cyrtolites ornatus
Conularia
Diplograptus
Gingula.

Last two, 11 + 12, = *Magnusata* formation.

Transition bed.

10. *Triplonia* bed. Scale mound. Ill. D

(30 ft) *Triplonia ulrichi*
Plectambonites praecox
Certhis subquadrata
Certhis Kankakeensis.

9. *Murchisonia* bed

(35 ft) *Murchisonia curvata*.

8. *Gingulasma* bed

(30-35 ft) *Gingulasma galenensis*
Gingulasma
Plectambonites gibbosus.

7. *Camarella* bed.

(30 ft) *Strophomena trilobita* from here up.
Zygospira uphami.

6. *Certhis* bed.

(40 ft) *Certhis americana*
Plectambonites americanus.

5. *Fucoid* bed

(18 ft) *Chonetes lycoperidum*
Prasopora ontario
Plectambonites sericea
Certhis subquadrata
Rhynchonella in various sizes
Prasopora

4. Stictopora bed.
Stictopora minutalbis
Rhynchidictya.
(55 ft)

3. Stictoporella bed.
Stictoporella frondifera
Rhynchonella ainsliei
(15 ft)

2. Bellerophon bed.
Bellerophon miscelensis
" libbii
(15 ft)

1. Buff limestone.
Rhynchonella orientalis.
(25 ft)

Orthis bifurcata Trenton form
from 5 up.

Orthis lynx + acutolirata absent.

Ollatulus in all beds of Galena.
absent in Magnesian.

Certhius. Heringensis.

Certhius virgata,
8
7
6 very abundant
5 very abundant
4

Certhius meeki 200 ft above Lewis
ex frd, Lefrancois.
Madison Sand.
Not in Minn.

Certhius virgata. 13

Certhius terea

Certhius corpulenta { 13
10

Certhius emacerrata
= major
13
12

Certhius pumecta
10

Orthis futilis
10

Certhius multisepta 12

Artificial

Multisepta: 2 primary median
folds in pedicel valve.
branch about 3 times.

argata - ancestor of multisepta 3

multisepta: Stronger median fold & sinus
than argata.

argata: Double median plication
in pedicel valve.

terre: double median plication of
pedicel valve.

Artificial Relations

terra argata multisepta	=	single dorsal plication
		double ventral " "
		Common parent.
		Surface ornamentation as in multisepta.

This character distribution found
also in { D. argata &
D. confusum.

confusum.

emarginata puncta foveolata	single median plica- tion. Surface with out mi- nute transverse markings of multisepta.

Plectambonites.

recedens. Pal. Ohio. vol. 7. p 70.
pl. 5. figs 3 a-e. = upper Cincin.

on center of recedens. = figs. 3 f-h,
150 ft above below.

aspera. = from Cincinnati shales.

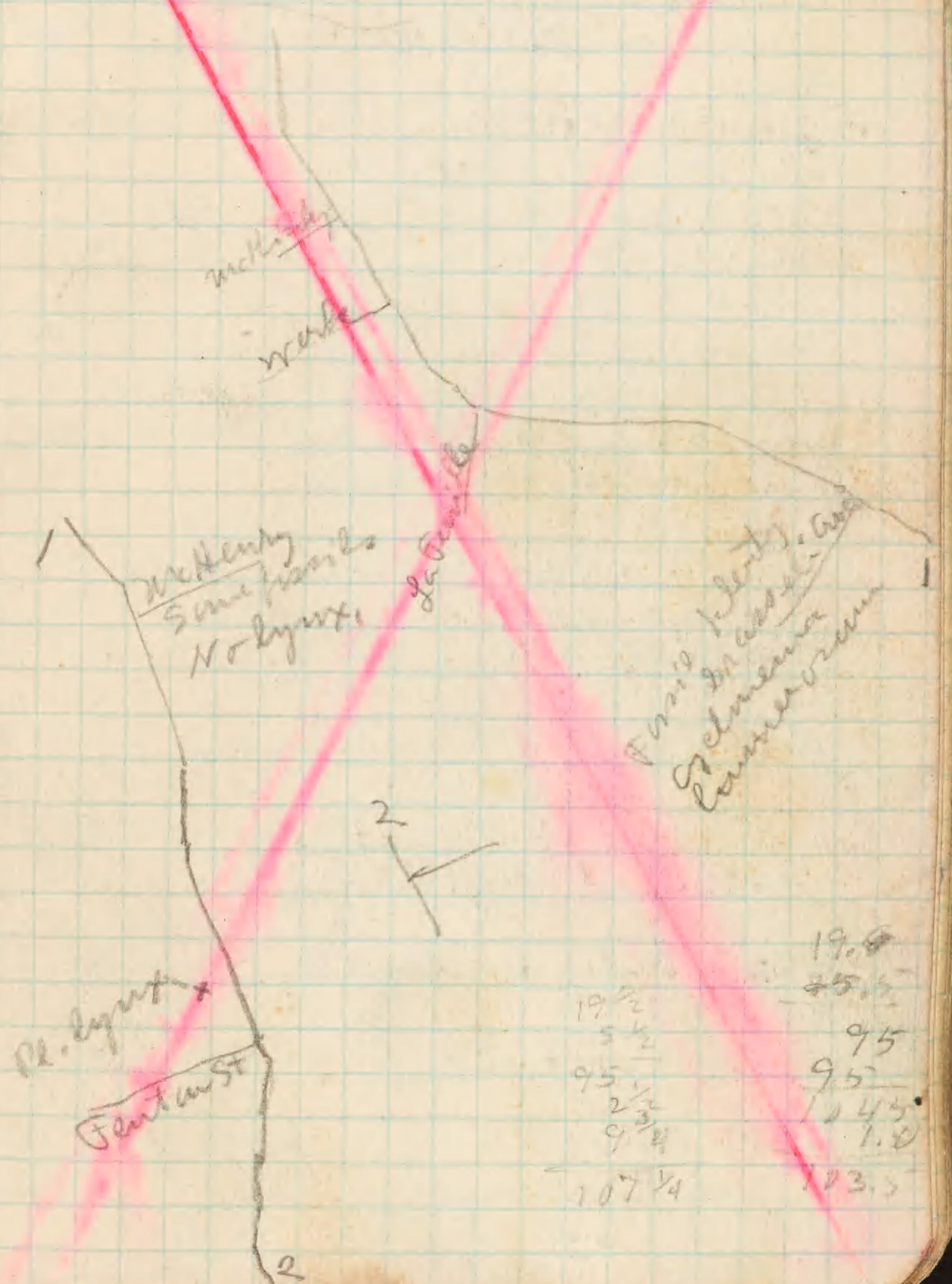
(Rhynchotrema perlumellera
has not been rediscovered
unless it is Rh. capax.
Rh. neenah,
Rh. perlumellera
all from top of Magnesian

A and look of trees of Northern
States and Canada.
R B Hough.
Lynnville N.Y.
published by author.

5 12
1 - 7
3 11

Harrison Ave + McKinley Ave.

Dinorthis retrorsa
Leptaena rhomboidalis



19.8
25.5
95
95
104.5
1.8
103.5

SW of Oxford, Ohio.

Dinorthis subquadrata /

Hebertella maculata 904 ft.

Strophomena *gibbosa* is

very abundant just at *Hebertella*

maculata layer and in

the underlying part of the *Hebertella*

beds.

Very large *Hebertella maculata*

1 1/2 inch wide.

Leptaena rhomboidalis very

abundant below *Hebertella maculata*

about 3-4 ft. - 899 ft.

Rhynchotrema pulchella 899 ft.

Strophomena retusa a young form

at 899, just below the *Hebertella*

maculata layer.

Strophomena neglecta at 897 ft.

Strophomena like *retusa* at 892

Strophomena retusa typical 889 ft.

Dinorthis retusa *Wagneri* the form

found at 889 ft.

Rhynchotrema dentatum, found at

889.

Stroph. neglecta in situ at 887 ft.

Dalmanella *gibbosa* 879

Joe Breitenbecker

Oxford, Ohio, to Aug. 1.

Travels in Ohio after Aug. 1.

Oxford

Interlobatus? fairly common.

a. dentatum common.

Hebertella *maculata* common.

a. sulcata common.

a. divaricans, common.

a. vetula rare.

a. canadensis not common.

500
Oxford

SW of Oxford. Ohio

Diphyllus subquadratus

Hebertella maculata 904 ft.

Strophomena *percarinatus* is

very abundant at *Hebertella*

maculata level in

the underlying part of the Liberty

beds.

Very large *Hebertella* *maculata*

1 1/2 inch wide.

Leptæna *subnubialis* very

abundant below *Hebertella* *maculata*

about 3-4 ft. - 899 ft.

Rhynchotrema *percarinatus* 899 ft.

Strophomena *retrocurva* forming part

at 899. just below the *Liberty*

percarinatus layer.

Strophomena *neglecta* at 897 ft.

Strophomena *retrocurva* at 892

Strophomena *retrocurva* typical 889 ft.

Diphyllus *retrocurva* Wagner with *Liberty*

zone at 889 ft.

Rhynchotrema *dentatum* *Liberty* at

889.

Stroph. *neglecta* in *Liberty* at 887 ft.

Strophomena *retrocurva* 879

Joe Breitenbecker

Oxford, Ohio, to Aug 1.

Trenton, Ohio after Aug 1.

Lichenoremus *intercalatus*? fairly common.

Rhynchotrema *dentatum* common.

Hebertella *richmondensis* common.

Strophomena *subleata* common.

Strophomena *divaricans*, common.

Strophomena *veteris* rare.

Strophomena *canadensis* not common.

3 mi. NW of Court house at Hamilton,
NW branch of Two mile creek, along
by road from 704 N to 869.

Here *Pl. lym.* occurs moderately abun-
dant between 727 and 730, the
remainder not well exposed.

Donathia retrorsa, single good
specimen at 760. This is brown
than supposed, but the small
many have dropped a short
distance. Numerous shallow
specimens along the road above
this level.

3 mi. W of North of Hamilton, 1/4 mi
West of 860 in section 18, the same
bedded limestone at the base of
the Waynesville bed, as along
Salmon Run is found. A good
Donathia retrorsa is a large but
unweathered fresh one not rock
occurred 25 ft lower. According
to this the *Donathia retrorsa* horizon
should be placed here at about
780 ft.

Acidaspis onealli.

Thorax with 10 segments. The pleurae
with two spines, Posterior spine of
posterior segment = 4 mm.

Anterior spine of posterior segment = scarcely
one mm.

Posterior spine of 5th segment = 3 mm.
Middle lobe of thorax near anterior
end = 4 mm. Gaster 4 mm.
near middle length of body, not
counting the spine.

Oogonium with 2 spines 6 mm. long,
4 intermediate spines 1 1/3 mm. long,
and at least 3 lateral spines of which
the inner two are also about 1 1/3 mm.
long.

Head and spines of oogonium rather
roughly granular.

A second oogonium has the interme-
diate spines scarcely 1/2 mm. long.
Sexual difference.

High bank of Four Mile Tallapoosa
creek 2 1/2 mi. N of Oxford, west end
part of section 11, found by Dr.
Stephen R. Williams, in lower
part of Waynesville bed.

W of Riley

Dinorthis retrosa 22 ft above creek
in SE corner of 16. *Leptaena rhomboidalis* is fairly common just below. *Dalmanella* just a small distance below the retrosa horizon.

3 mi W of 7 Mile P.O.

Hebertella is a culpe 50 ft below cross road where sections 16, 17, 20, 21 meet. One will reach the creek must be nearly at base of Waynesville.

Henry's Run, below iron bridge in Dry Fork.

Hebertella is a culpe.
10 ft down - *Leptaena rhomboidalis* common. Below in intervening section also.

14 ft total. *Rafinesquina dentata* layer.

16 ft total. *Stroph. neglecta*.

17 ft total. *Stroph. natans* typical.

18 ft total. *Stroph. natans* & *Leptaena rhomboidalis*. *Stroph. planumbona*.

20 ft total. *Stroph. neglecta*.

20 ft - 22 ft. *Stroph. neglecta* & *Stroph. natans* very common.

23. *Leptaena rhomboidalis* & *Stroph. planumbona*. *Crania* below. *Leptaena* below.

26. *Leptaena rhomboidalis* & *Dalmanella* just below both rare.

36 1/4 mi W of Cincinnati down to
retrosa - one culpe horizon.

Hebertella is a culpe 871 ft above
sea level in Gage's hill, 3/4 mi
W of Millersville, 1/2 mi N along
N & S road.

NE of cross road 1 mi W of
Millersville.

771 ft - above sea level - top nodular
layer of *Am. lemn.* The underlying
limestones and clays well ex-
posed - 4 ft with plenty of *Dalmanella*
at top. Thick heavy bedded coarse
limestone layer 8 in thick near base
of Waynesville.

1757 ft = *Dip. retrosa* according
to calculation.

Dinorthis retrosa 1/2 mi E of school
house No 6 in section 27, 3 1/2 mi
W of Millersville at about 755

S of school 5 in section 20, 2 1/2 mi
NW of Seven Mile P.O. = *Dinorthis*
retrosa.

Dinnithia retorsa 2 mi NW of Middle-
town CH + D station, at first
bridge across branch of Elk River, near
west edge of section 17 on pike across
middle of section = 735 ft above sea
level.

Dinnithia retorsa
726 ft above sea level.
1 1/4 mi NW of CH + D depot at
Middletown, along road going
west up a creek.

Dinnithia retorsa on Brown's run.
721 ft above sea level

From Carlisle CH + D depot over
2 miles SW and nearly 1 mile N, on
line between Montgomery & Butler
Counties, top of nodular layer at
top of Ambler is 730 ft above sea
level just below the small bridge.
This would place the *Dinnithia*
retorsa layer at 716 approximately.

1510	888
<u>868</u>	<u>820</u>
1442	68

Oregonia. 1906.

- *Hebertella insculpta*. Upper layer. 4 ft.
- Leptaena + planumbona* 5 1/2 ft.
- Dinorthis scovillei*
- Strophomena neglecta* with } 9 ft.
- Strophomena ventrosa* at base }
- Interval in closing gigas layer 12 ft.
- *Hebertella insculpta* lower layer 3 ft.
- Leptaena + planumbona* 5 ft.
- Dalmanella jugosa* very common 5 ft.
- Orthoconas *fastidiosa* clay 5 ft.
- Dalmanella jugosa* 3 1/2 ft.
- Clay rubble with *jugosa* 5 ft.
- Clay + clay rubble 3 1/2 ft.
- Nodules top of *Ambridium* 7 ft.
- Strophomena concinna*
- Interval 16 ft.
- Dinorthis retrorsa* 1 1/2 ft.
- Lowest limonite zone 20 ft.
- Clay 6 ft.
- Interval 4 1/2 ft.

Oregonia 1908

- Dinorthis subquadrata*
- 2 ft interval
- 1 1/2 ft *Plectambonites serratus*
- 7 1/2 ft interval.
- 4 ft *Hebertella insculpta*
- 4 1/2 ft interval.
- 3 3/4 ft top of wave marked limonite layer
- Dinorthis scovillei*
- 12 ft interval with *Strophomena neglecta*
- Strophomena neglecta* and
- Strophomena neglecta* and
- 8 ft interval
- Wave limonite layer. top.
- 5 ft interval
- 1 1/2 ft *Hebertella insculpta* abundant
- 2 1/2 ft interval
- 37 3/4 ft interval *Dalmanella jugosa*
- 6 3/4 ft nodules top of *Ambridium*
- Strophomena concinna*
- 16 1/2 ft interval
- 2 1/2 ft *Dinorthis retrorsa* common
- 3 ft interval.
- Dinorthis retrorsa*
- 3 ft interval
- 1/2 ft *Leptaena planumbona*
- 1 1/2 ft interval
- Platystrophia lynceus*
- 6 1/2 ft interval.
- Little *Strophomena*

Oregonia

Along RR NW of Bridgetown, Oregon
retroza, Leptaena and lynx ^{specimen}
at 900 ft = 37 ft above top of
Mt Auburn with lynx common

- 131½ Dinorthis subquadrata lures
10½ ft interval
121 Helbertella insculpta 4 ft
117 5 ft interval
112 Dinorthis scutellata
112 Strophomena neglecta montana 12
100 13 ft interval
87 Helbertella insculpta 1 more layer
86 63 ft interval Dalmanella pygma
13 Nodular bed at top of Auburn. Top.
23 ft interval
0 Dinorthis retroza

2. Wayne Township, Clermont Co.
1/2 mi. NE of Mideast P.O. West side
of Stony Lick Creek. Platystrophia
lynx common at 1450. Dalmanella
lynx common above. Few
specimens of P. ascerus, apparently
by Darwini, but too poor to be certain.

3. 1/2 mi. SE of Charleston. Lynx of
Mt Auburn abundant. Crinoid
beds not present. Base only pres-
ent.

4. SE of Charleston. Mt Auburn.
Base of lynx beds. Lynx abun-
dant.

7. $\frac{3}{4}$ mi. S of Fayetteville.
Stream N of G. Fentons.
Upper *Hebertella insculpta*
15 ft interval
20 ft interval
5 ft interval
2 ft Lower *Hebertella* in *insculpta*
7 ft above river level

1485 Upper *insculpta*
22
1463 *Hebertella* in *insculpta*
52
1413 Base of *Hebertella* all.
23
1390 return level.

8. Clanton strong West dip.
Dinorthis subquadrata
Pectinaria *brachyotus* *sericea* abundant
Hebertella in *insculpta*
Strong wave marks & a few
limonite nodules at several
places had been. E of
Fayetteville & base of *Hebertella*

9. Half mile west of Clanton, immediate S of bridge.
Return S to lower East Fork.
Concordensis very common in
clinks cut across, some are in
mass good for the collection.

10. *Lynx* & *Leptæna* just N of bridge.

Eddies Run 1 mi E of Clanton
down pike from Decatur to West
Union in Old man Cr.

- Concordensis* common. Several feet
18 1/2 ft interval
1/3 ft *Leptæna* rare.
5 ft interval
1 ft *Leptæna* *Hebertella* abundant
10 ft interval
1 ft *Lynx* & *Leptæna* associated, not in
separate layers.

R = $\frac{3}{4}$ mi NW of Bentonville on dirt
road, across Eagle creek N of creek
1630 Upper *insculpta* layer

- 16 1/2 ft interval
Strophomena neglecta & *retrota*
3 ft interval, *neglecta* & *retrota*
Strophomena
1600 base of Eagle creek.

S. 3 miles NW of Bentonville
South of mouth of Gordon Run, upstream
south of Eagle creek.

- 1805 Clanton about 5 ft above base,
1690 Catagys ^{common} heads over lower *insculpta*,
1689-1680 *jugosa* & *planumbona* very common,
1670 *Concordensis* strong dip here
1645 Eagle creek
1630 Top of hill
1830 Base of Clanton

Copied 1914

Concord,

S = *Cataglyphis* heads loose,

Myrmica, *disrupta* base,

11 ft interval,

Stroph. retusica,

4 ft interval,

Stroph. neglecta abundant

5 ft interval,

Wave marked layer with *Leptaena*

2 ft interval,

Limestone with *Leptaena* abundant

10 ft interval,

3 ft. Limestone with *Stroph.* planum

S = *Leptaena* abundant.

Plectambonites + *jugosa* abundant

2 ft interval,

Wave marked Limest. *jugosa* common

18 1/2 ft interval,

Road crossing over creek.

Manchester,

Amherst NW of town, north of bridge
at junction of Bradyville and
Abundant picks.

Top of *Stroph.* *Concordensis* zone,

47 ft interval,

5 ft with *Leptaena* rather common
but loose.

27 ft top of massive Limestone

regarded as top of Mt Auburn.

This gives 79 ft to Amherst.

20 ft Mt Auburn,

71 ft Concordville.

20 ft Bellevue with *Lyons* abun-
dant. Purple layers.

12 massive cross bedded top of
Fairmount.

Vanceburg,
Shale Point

R

- 3 ft fine wave marks
interval with freestone layers at top,
top of section.
several freestone layers. one at
8 ft interval, chiefly shaly but several
3 ft freestone layers. Heaviest seen. D
5 ft 5 in. interval. Shaly, rubble shaly.
1 ft 1 in freestone layer. good.
1 ft interval. } C
2 ft 7 in Heavy freestone layers.
10 ft chiefly shaly, with some freestone
1 ft 1 in freestone layers. B
10 ft chiefly shaly. 253
quarried
4 3/4 ft 3 layers of freestone, could be A
stone.
8 1/2 ft shaly with several layers of free-
21 1/2 ft chiefly covered. Barrenish except
all over shale.
29 1/2 ft More fossils carbonaceous shale
top of section. Carbonaceous shale
19 ft to base of clay shaly
13 1/2 ft to thick end of log.
More carbonaceous shale. Top of Olive shale
Argillaceous shale = Top of Olive shale
48 ft interval. Light colored, soft clay shale.
103 1/2 ft interval. Light colored, soft clay shale.
Chagrin formation
60 1/2 ft Green part of Olive shale down to bottom of
creek at bridge, on page.
Impure Williamsburg and large
Y. fossils about 10 ft below top of
upper division of Olive shale.

Vanceburg,

- 95 ft Ferruginous shale rubble. 647 1/2
42 1/2 ft Ferruginous clay shale rubble 592 1/2
with little freestone.
13 ft freestone & shaly. 550-
18 1/2 ft freestone & shale (fossils collected)
1 ft 3 in freestone ledge. 518-8
various levels.
37 ft interval. freestone blocks at
16 ft freestone abundant. fairly
heavy with 1 good Tarrus midway
2 1/2 ft stone.
Nodular stratum of impure limestone
abundant. Tarrus rather rare.
23 ft interval with heavy freestone layers
intervals up to top.
gall. heavy layers at various
44 ft freestone with Tarrus and
2 ft 1 in freestone layer. shaly
5 1/2 ft interval. shaly.
* 4 ft { 3 1/2 ft } freestone ledges. canth. galli
2 in { 1 1/2 ft } common.
1 ft
8 ft 6 in interval. purple ferruginous shale
1 ft freestone with canth. galli abundant
ferruginous.
46 1/2 ft shaly interval. somewhat more
5 1/2 ft freestone
3 1/2 ft little freestone near top
R. Chagrin sandy shale rubble with

Vanceburg
Shale Point.
Condensed section.

137½ ft Ferruginous arg. shale rubble

85¾ ft Freestone at various levels,
Tarnums only near base + rare.

* 2½ ft. Nodular impure limestone layers

74½ ft Freestone at various intervals
Tarnums not common.

* 4 ft 2 in Tarnums common in freestone 175

* 8 ft 6 in Purple ferruginous shale,
1 ft Tarnums common in freestone.

52 ft Interval with 5½ ft freestone at base.

31½ ft shale rubble chiefly

56 ft 6 in freestone at various intervals.

21 ft 6 in chiefly arg. lacustrine shale rubble

273 ft Ohio shale measured down to
cut just below bridge along road

28 ft 6 in down to top of Monroe.

301 ft 6 in = total Ohio shale.

Alum Rock for comparison. See
3rd page following.

223 ft

Iron ore?

Black blued?

*

113 ft

Congalarga?

38½ ft Interval to top of Tarnums
common.

15½ ft Sinking black shale (15-16 Andromeda)
21 ft 3 in Berea freestone

42 ft 9 in chiefly rubble = Bedford.

36 ft 6 in chiefly freestone = Bedford

21½ ft { on yellow arg. shale rubble with
11 ft white clay at base.

242 ft 3 in Ohio's black slate

Maxville limestone

- Burlington
+
Berkeley
- 115 ft Logan Central bluffs
85 ft buff arenaceous
shales and thin bed-
ded sandstones
17 ft quite massive buff
sandstone
6 ft argill. shales.
90 ft Black band.
1 ft Conglomerate II
identified by Herrick
to Scottsville.
6 1/2 ft All on a shale is
very persistent with
Spirifer + fossils
very persistent out to
Scottsville.
25 ft Massive fine
grained.
5 ft Conglomerate I is
less persistent out
than Conglomerate II.
200 ft Conglomerate (275 - 317)
40 ft fossiliferous shales
Calcareous chert
in many layers, for-
sils
Shales and sandstones
15 ft Sumbury
30-40 Berea ss
85 ft Bedford

Buena Vista.

- 16 ft chiefly shale, upper part reddish.
5 ft 7 1/2 in. Buena Vista = City ledge,
Tarranus abundant.
5 ft 4 in fine clay.
16 ft Sumbury shale.
1 ft 9 in Massive Berea ss
Thinner bedded + shaly.
110 ft }
much heavy ss in Bedford.

X Vanceburg.
Alum Rock.

38 1/2 ft { interval top = freestone full of *P. acuminatus*
Lower 11 ft weathered to white clay, ^{anc. sin.}
15 1/2 ft S. ^{ing. of *P. acuminatus* or *acuminatus*} Black shales. ^{cert. sin.}

2 1/2 ft 6 in freestone layer top = ripple marked
3 ft 6 in freestone.
4 in freestone.

2 ft 10 in several freestone layers. top layer ripple marked.

1 ft 5 in freestone layer. top = ripple marked shaly at base.

1 ft 1 in freestone, ripple marked at top.

4 ft freestone, several layers.

1 ft 8 in freestone top = ripple marked, base shaly.

1 ft freestone, shaly at base.

1 ft 5 in freestone layer.

11 in freestone in rather thin layers.

7 in freestone. 2 layers. top of top layer with ripple marks.

S. ^{cept near top and base}

42 3/4 ft { 36 ft 9 in Interval. chiefly shale rubble, but covered
4 in freestone D

5 ft 8 in arg. shale rubble

1 ft freestone layer C

6 ft chiefly shale rubble, covered.

1 ft 6 in freestone layer. shaly at base.

2 ft 2 in freestone layer. covered at base B

1 ft 7 in shaly.

7 in freestone.

2 ft shaly.

10 in freestone.

1 ft 1 in shaly.

1 ft 6 in freestone layer top wave marked A

1 ft shaly.
2 ft 3 freestone layers.
7 ft 6 in { principally shaly toward top = 2 1/2 ft
1 ft 8 in freestone.

21 1/2 ft chiefly shaly. Lower part more argillaceous and weathering in lower 5 ft to white clay. No phosphatic nodules.

24 1/2 ft 3 in down to RR ledge. Top of Alum shale cert. sin. *Lingula nebulosa* are about 15 ft below top

Vanceburg,
Shale Point,

B₂

R-

1 ft. Buena Vista City ledge

21 ft { Including white clay section above
Sumbury & Sumbury shale below.

16 3 ft Berea ss.

3 ft layer, with parting near middle,
9 in layer.

6 in thin shaly freest me.

1 ft 3 in layer, ripple marks

1 in layer fine ripple marks

5 in layer fine ripple marks

5 in layer fine ripple marks

9 in layer

10 in several layers with ripple marks

1 ft layer.

1 ft 4 in layer with ripple marks

7 in thin shaly layers with ripple marks

10 in layer, ripple thing in top.

8 in layer.

9 in weathering soft and shaly.

1 ft 6 in layer.

Sum of preceding = 14 ft 8 in.

Discrepancy due to washing out
of clay along edges and dropping
of freest me layers.

340 1/2 ft chiefly shaly freest me rubble. Bedford
shale

37 1/2 ft chiefly shaly freest me rubble surface
4 in freest me

1 ft 3 in shaly

4 in freest me

5 ft chiefly shaly freest me rubble.

A₂

Vanceburg Shale Point.

2) Bedford ss

3 ft 2 in freest me & layer, largest
seen.

1 ft 3 in shaly

4 in freest me.

3 ft 11 in shaly.

1 ft 2 in freest me

1 ft shaly

2 ft 7 in freestone, irregular base

2 in freest me irregular base,

1 ft 5 in shaly

9 in freest me.

5 ft 6 in chiefly shaly covered in part.

9 in freest me.

6 in shaly

1 ft 9 in freest me

1 ft 2 in freest me

8 ft 4 in chiefly shaly

7 in freest me.

1 ft — freest me.

1 ft — covered

9 in freest me.

8 ft 6 in { 2 ft 3 in shaly

3 in freest me

4 in shaly

2 in freest me

1 ft 4 in shaly

3 in freest me

3 in shaly

4 in freest me

3 in shaly

4 in freest me

difference
due to
slumping

21 ft 6 in chiefly covered. Bedford
= Lower Bedford shale at base.

C₂ Variscus Shale Point,

188 4 in.

13 ft various freestone layers
fossils collected
72 ft 9 in freestone at various levels
2 1/2 ft nodular limest. layers
67 ft freestone at various levels
2 ft 1 in freestone layers
5 ft 6 in interval chiefly covered

104 ft

8 in emerald freestone
9 in Candagalli freestone
7 in clay thin freestone
1 ft 5 in freestone
4 in clay
10 in Candagalli, freestone
1 ft 8 in light brown argill. shale
6 ft 6 in purplish argill. shale
6 in freestone with Candagalli
R 13 ft 9 in olive colored shale chiefly
Covered in large part.

Well top of Buena Vista incline 5. X
Vastine creek. Buena Vista freestone Co.

3-3" freestone } Buena Vista City ledges
4" shaly }
2-4" freestone }
7-8" whitish clay with phosphatic nodules, sandy at top. X
15 ft Sumbury black shale

Incline 4.

13 ft seen, soft clay shale, part reddish
3 ft - freestone }
4 in soft clay shale } Buena Vista City ledges
1 ft 9 in freestone }
23 ft } Grey clay shale soft
Sumbury shale fossil
131 ft interval up very vertical slope
Ohio shale

Porter in with

John Wright quarry 2 1/4 mi. up Carey run.

James Amelin quarry, above a bank, about
3/4 mi. up Stony river.

Portsmouth A'

Bodmer's quarry. 1 mile below

Wright's quarry, on Carey run.

231 clay shale. top not seen. see R. 53
1 ft 5 in. freestone

11 in freestone, chaly layers.

5 ft clay shale

6 in first one

2 mi clay shale

1st 4 in frost me

3 in. clay shale

6 in freestone.

3 ft 6 in clay shale

1 ft 6 in heißt nie

2 in clay shale

21st present me

in day school

My friend me

2 in clay shale

1 ft 6 in 'frost' me

1 1/2 ft freestone

2 in clay shale

10 in breast no.

14T 2 in front me

4 in. clay shale

3 in. short, first one

7m freestone

6 in front me

6 in front of

9 in Grestme

1 ft 2 in. first one

198 1st June

16 in. *fructu*

5 in breast

2 1/2 clay rh. of

10 in front

17ft 2 in

Portsmouth A²

Bodmer quarry,

6 in clay shale	}	4 ft 3 1/2 in
9 in freestone		
4 in clay shale		
1 ft 2 in freestone	}	same freestone
1 ft 2 in clay shale		
4 1/2 in freestone		

Portsmouth with,

Part of the way,
Opposite Frank Krauss.

3 in	nodular ferruginous layer.
8 in	freestone.
2 ft 6 in	clay shale
8 in	freestone weathering shaly.
1 ft	clay shale.
2 ft 10 1/2 in	freestone.
6 ft	clay shale with nodules 1 ft above base.
1 ft 3 in.	{ freestone, weathering coarsely nodular and ferruginous. Lower part of overlying layer, spalling, but not nodular or ferruginous.

{ 315
298 blacksmith shop

380 = Sundry. lower part of exposure
in Spring Run.

Portsmouth, 1 1/2 mi West of
 Reitz's quarry, in Carey Mts.
 2 1/2 mi up creek from above quarry

23 ft	clay shale top not seen
1 ft	freestone
4 ft 6 in	clay shale
5 in	freestone
10 in	shaly freestone
1 ft	freestone
2 in	shaly freestone
6 in	freestone
3 ft	clay shale
1 ft 3 in	freestone
1 in	clay shale
2 ft 4 in	freestone
3 in	clay shale
1 ft 3 in	freestone
1 ft 4 in	freestone
11 in	freestone
1 ft 4 in	freestone
4 in	clay shale
5 in	freestone
5 in	freestone
9 in	freestone
10 in	freestone
1 in	clay shale
1 ft 1 in	freestone
1 ft 1 in	freestone
1 ft 3 in	freestone
6 in	freestone
1 ft 6 1/2 in	freestone
6 in	clay shale
1 ft 2 in	freestone
2 1/2	clay shale
1 ft 8 in	freestone

20 ft 7 in

Portsmouth
 Reitz's quarry

1 ft	clay shale	}	23 ft.
9 in	freestone		
2 in	clay shale		
9 in	freestone		
1 1/2 in	clay shale		
9 1/2 in	freestone	}	branded & given by quarryman
9 in	clay shale		
1 ft 2 in	freestone		
3 ft	clay shale		
2 ft 6 in	freestone		
1 ft	clay shale	}	
3 ft	freestone		
5 ft	clay shale		
3 ft	freestone		

Ports in outth,
St very Rm. Am line quarry,

13 ft clay shale. top not seen.

4 in freestone

2 in shale

1 ft 3 in freestone

3 in clay shale

6 in rock weathering shaly

4 ft clay shale

4 1/2 in freestone

7 in clay shale

8 in freestone

2 in clay shale

4 in freestone

2 ft 10 in clay shale

1 ft 7 in freestone

2 in clay shale

2 ft freestone

2 1/2 clay shale

1 ft 7 in freestone

1 ft 3 1/2 in freestone

1 in clay shale

1 ft 1 in freestone

1 in clay shale

1 ft 6 in freestone

24 ft 4 in interval

9 ft 7 in

Interval from Sunbury to
top of Bena Vista = 59 ft 9 in.

Bena Vista

4 in { weathering coarsely nodular
ferruginous freestone
freestone.
interval covered.

1 ft
23 ft

city ledge?

2 ft 4 in freestone

{ blocks

gives rather coarsely nodular

1 ft 9 in freestone weathering out in ferru-

2 ft 6 in freestone

14 ft clay shale with nodules 2 1/2 ft above base

becomes more even bedded up stream

3 in nodular ferruginous layer

5 ft clay shale. Not seen in vertical section

Sunbury black shale

25 ft 10 in

Peebles Quarry Hill section.

- 11 ft fire clay and irregular lentils of SS,
 2 ft 6 in dark arenaceous shale.
 1 ft black bituminous shale & coal.
 9 ft interval covered.
 2 ft - fire clay
 5 ft 6 in quartz rather fine grained SS (limit of Waverly)
 3 ft 10 in Waverly freestone.
 13 ft chiefly covered.
 42 ft { occasionally. Tarnums at top?
 22 ft { SS, thin SS, shaly layers, and thin clay shale.
 3 ft 9 in thinner SS and shaly SS, Tarnums?
 12 ft { 6 ft massive sandstone, rather thick layers
 6 ft similar massive SS but weathered softer.
 19 ft sandstone and considerable
 rock weathering shaly.
 44 ft { 25 ft covered. probably weathering shaly in
 part as in underlying beds.
 120 ft { 37 ft 6 in freestone weathering shaly in part. High
 so called sponge 6 ft below top.
 43 ft freestone section weathering in part
 37 ft 6 in freestone section - to shaly stuff
 11 ft shaly freestone with a few solid free-
 stone courses near top.
 42 ft 6 in covered.

- 44 ft brownish more arenaceous shale.
 50 ft this part of shale worked by Peebles,
 base of gum tree
 73 ft 6 in blue shale also quarried by Peebles.
 lowest exposure at switch in quarry.

= about 4 miles up the river, from Ports-
 mouth, up gully between 2 hill angles
 quarried for shale.

- 22 ft { worked at top, glass sand.
 { strongly cross bedded in upper
 { white quartz or massive SS.
 3 ft 6 in interval

In this section all the Waverly rocks are
 freestones and not coarse enough to be
 called sandstones.

230	42 ft Logan freestone	488+
	176 ft Black Hand freestone	446+
230	170 ft Cayahoga shale	270+
	? interval	
230	60 ft Berea Vista freestone	198
	15 ft Sandburg	138
230	16 1/2 ft Berea freestone	123
	40 ft Bedford shale	107
113	37 ft { Bedford Sandstone	67
	9 ft { Similar to above	30
	21 ft Bedford shale	21

NE of Sciotoville.

About 2 miles SW of Depue.

Base of Sheahan conglomerate + SS,
19 1/2 ft interval

NE of tressle 390, conglomerate 2 is
found about 2 feet above the creek
bed.

interval

NE of mile post 11 from Portsmouth the
fossils are found in creek bed. A
short distance up stream, above
tressle 394 the freestone contains
few pebbles, hardly enough to be
called a conglomerate

South of tressle 397 shaly freestone appears.

Section in gully below bridge 395,

Black gl. & buff freestone above.
9 ft massive buff freestone in Logan
covered.
2 ft
6 ft Conglomerate No 2 + Sandstone.
16 ft Buff freestone.
2 ft Conglomerate + SS No 1.
14 ft Buff freestone
13 ft mostly covered, some freestone
water level

South of bridge 398, at Slocum Station
the upper sandy part of the shale
series appears to occur.

Limeriville. Railway section.
 1/4 mi up the hollow from the station, and
 up the second hollow on the west side for
 1/4 mi, then up the railway northward.

at foot of section below B 1000 there
 are 33 ft additional of freestone,
 and shaly freestone, making a total
 of 274 1/2 ft below the Maxville limestone
 without exposing the argillaceous
 shale quarried by the Peabody Co at
 the base of their quarries.

- 149 ft { middle part brecciated.
 5 1/2 ft { Maxville limestone arenaceous looking
 18 ft Covered
 22 ft Thin shaly freestone rubble.
 13 ft { into shaly rubble, rather crumbly pieces
 { more massive freestone, weathering
 25 ft shaly freestone.
 2 ft Massive nodular layer of freestone.
 10 ft thin freestone shale rubble. covered section.
 21 ft Rather massive freestone.
 { 21 ft shaly freestone.
 { 17 1/2 ft shaly freestone a little
 Base of railway exposure. Thistle.
 92 ft interval.
 B 1000 - Freestone layers 1 ft thick weathering
 like large nodular shale.

Limeriville.

A quarter of a mile westward along
 the top of the Clinch river bluffs, a
 layer of fine clay coarles uncon-
 formably the top of the Maxville
 limestone, sagging down into
 it about 5 ft.

Maxville section at this locality.

- amount of erosion
 6 ft fire clay, green flint clay.
 { 2 ft very loosely brecciated, disintegrating
 { irregular surfaces
 2 ft { Maxville l. brecciated in part.
 { integrates & weathers.
 1 ft 6 in soft rather coarse breccia dis-
 1 ft 8 in massive coarse grey l.
 { at base coarse.
 1 ft 7 in massive shaly grey lime breccia
 2 inches irregular shaly & breccia parting.
 1 ft compact grey limestone, lower
 surface uneven.
 1 ft + or - shaly soft coarse breccia
 10 ft massive compact limestone
 with some calcite & brecciated pieces.
 21 ft massive grey coarse limestone
 brecciated in part.
 5 ft { very sandy light grey limestone,
 { some particles rounded & worn

Grassy Fork of Kinney, 2 mi. from Kinney
 3 1/2 mi. SE of Vanceburg, on E slope of Vanceburg
 hill.

R

- 2 in clay
- 3 in freestone
- 2 in clay
- 1 ft 10 in freestone
- 4 in freestone
- 7 in freestone
- 1 ft 2 in freestone
- 2 in clay
- 5 in freestone
- 7 in freestone
- 8 in freestone
- 3 in clay

on road to Rand-
 ville,
 Thomas
 Bell, Jr.

- 10 in freestone
- 9 in freestone
- 6 in shale
- 10 in freestone

1 ft 9 in covered probably shale

2 ft freestone

3 in shale

10 in freestone

2 ft 8 in several layers of freestone & clay

2 ft 10 in covered probably shale

6 in freestone

1 ft 6 in shale

2 ft freestone

3 in clay shale

5 in freestone

5 in clay shale

6 in freestone

5 ft 6 in purplish clay shale

9 in freestone

8 ft 3 in clay shale covered except nearly

1 ft freestone

1 ft 9 in covered

5 in shale

base Q

S -

- 3
- 3
- 3
- 1
- 6
- 2
- 3
- 3

All freestone

1 ft freestone

1 in shale

2 ft 1 in freestone, shaly at base

1 ft 7 in freestone

2 in freestone

1 ft 6 in freestone with shaly bedding in middle

2 in freestone

10 in freestone

6 in shaly freestone

1 ft freestone

3 in freestone

10 in freestone

2 in clay

6 in freestone

1 ft 10 in clay shale

4 in freestone

1 ft 9 in freestone

9 in freestone

1 ft 8 in shaly freestone

6 in freestone

3 ft freestone

1 ft 6 in freestone

4 in shaly freestone

8 in freestone

5 in freestone

1 in clay

R 6 in freestone

25 ft

T

7 in freestone
 7 in shaly freestone
 7 in freestone
 1 in clay
 9 in freestone
 1 ft 7 in freestone
 1 ft 3 in freestone
 6 in shaly freestone
 7 in freestone
 1 ft freestone
 7 in freestone
 7 in freestone
 1 ft shale
 1 ft freestone
 2 ft 4 in freestone, weathering to several courses
 4 ft 3 in freestone
 2 ft 3 in freestone
 6 in freestone
 1 ft 5 in shale & thin freestone
 8 in freestone
 2 in clay shale
 8 in freestone
 2 in shale
 10 in freestone
 3 in shale
 5 in freestone
 3 in clay shale
 7 in freestone
 6 in clay shale
 4 1/2 in freestone
 1 in shale
 7 in freestone
 5 in shaly
 2 in freestone

42
 27 ft 9 in
 6
 6
 6

S

V

1 ft freestone
 9 in freestone
 2 ft 6 in freestone
 3 in clay
 7 } all freestone
 7 }
 8 }
 4 }
 2 ft 1 in freestone
 8 in freestone
 1 ft freestone
 1 ft 9 in freestone
 1 ft 5 in = 3 freestone layers
 1 ft 2 in freestone
 2 ft 8 in clay shale
 6 in freestone
 1 ft freestone
 5 ft clay shale
 1 ft 6 in clay & freestone layers
 4 in freestone
 5 in freestone
 1 ft 9 in freestone
 2 in shaly
 3 1/2 freestone
 2 in shaly
 6 in freestone
 4 in shaly
 6 in freestone
 5 ft covered
 5 in freestone
 10 in shale
 1 ft 7 in freestone
 T 10 in shaly freestone

37 ft 9 in
 9
 9
 9

Q 13 ft Black fissile Sumbrook shale
 9 in freestone lenses.
 1 ft 3 in bluish shale, clayey.
 Berea top. Thin bedded freestone
 strongly ripple marked, in-
 terbedded with clayey shale
 of bluish color. Not a solid
 freestone as clay, which covers

Top of section

14 ft chiefly shaly,
 freestone.
 6 ft chiefly shaly with a little
 sand on top.
 several freestone layers
 6 ft 6 in shaly below
 several freest. layers near top
 5 ft 6 in shaly below
 8 in freestone
 2 ft several freestone layers
 10 in freestone
 3 ft chiefly shaly
 5 in freestone
 1 in freestone
 3 in freestone
 2 ft freestone + shale
 1 ft 6 in freestone
 7 ft 6 in chiefly covered, but some freestone
 3 ft 6 in chiefly clay with a
 little freestone

32 ft
 22 ft 3 in
 U

36
 100
 100
 100 1/2
 89
 100 1/2
 100 1/2
 63

139 12)689
 42
 25
 27
 122
 57 5 in

11 7 ft 8 in = sandstone
 section overlying
 the Sumbrook
 shale.

98
 99
 38
 93 1/2
 85
 93
 21 1/2
 100
 360

12)6884
 57 4 in
 82
 139

X

Ohio shale exposed at Harrison Chapel. near T B Harrison's store, 6 miles above mouth of Laurel, at mouth of Grassy Fork.

Sumbury shale exposed south of Harrison Chapel 1/4 mile, on road to mouth of Laurel.

1/4 mile farther on the same road, the Sumbury shale is underlain by characteristic Berea sandstone with ripple marks, as along the Elk river.

The Sumbury shale underlain by the typical Berea sandstone, and overlaid by 3 feet Buena Vista City ledge and a considerable section of purple clay as at Buena Vista, is exposed at the Pine Hill School, about 2 miles from the mouth of the Laurel, coming from Harrison Chapel way.

Beyond Cooper's store at Iron bridge the Bedford ss is exposed.

at Mrs. W. H. Blakeney's store, about 1/4 mile east of the bridge the Sumbury is exposed.

About 200 yds up Laurel from water crossing, near mouth of Laurel = Sumbury shale.

The City ledge with the underlying Sumbury shale is exposed half way between Rugless and the Tannery, or 2 miles below Rugless on Trace fork of Kinnick creek.

Along R.R. S.E. of Rugless the City ledge shales are well exposed, at near Big Cut the Black Hand ss & comes in.

On county line at Big Cut.
Top of exposure.

16 ft 6 in thin bedded to shaly white green ss, rapid dip & cross bedded, probably the latter.

5 ft 6 in Massive coarse grained ss with irregular sandstone nodules of iron. Same at top of Massville lime.

42 ft Massive light grey fossiliferous, exposed along road extending at right angles to cut. Collected fossils at top of section 20 ft.

Top of cut.
28 ft Massive coarse lime, apparently with much sand, shaly fossiliferous with Sumbury and antique ad. at + trace of Pennsylvanian Pentamerites.

8 ft 10 in red arg. shale.

bridge 38 ft above track.

29 ft 6 in thin bedded fine ss and

blue ss, alt crinoid stems in the
shales.



Maxville Limestone quarry $\frac{1}{4}$
mi. West of Carter City.

Top of exposed limestone.

20 ft. crystalline, fossiliferous, tan & light

5 ft 3 in. Interbedded, mostly weathered
to clay.

1 ft 9 in. Two layers gray l.

31 ft 6 in. Massive gray limestone layers
with small rounded quartz
grains in abundance.

29 ft 3 in. Massive gray l. some of
it was bedded.

Purple clay, at top of Waverly.

225 ft Waverly

Level of stream in valley



Sunbury shale at S. H. Harrison's in
gully N of house, about $1\frac{1}{4}$ north of
Strickletts.

Fault between Ohio black slate
and shaly sandstone at C. H.
Thomas, $\frac{1}{2}$ mi N of Strickletts,
along the road down Kinnick
Creek.

Ohio shale at bridge at Strickletts.

Ohio shale about 300 yds north of
James Hollan, on west side of road,
about 2 miles south of Strickletts
and $2\frac{1}{2}$ miles north of Cress.

About $\frac{1}{4}$ mi up Elk Lick, at a tenant
house owned by J. E. Kegley,
Ohio shale, 15 ft thick at least, is ex-
posed. The mouth of this Lick is $2\frac{1}{4}$
miles S of Strickletts.

At mouth of Elk Lick, $2\frac{1}{2}$ mi south
Strickletts, on hill angle SW of road
junction.

Sunbury shale fragments.

(Berea tip, ripple marked, about $7\frac{1}{2}$ ft
covered.)

75 ft }
Berea

30 ft Ohio slate. Black fissile carbona-
ceous.
Road level

Ohio shale at Abram Chapel. about
1 mi. N. of Crum's Store,

Ohio slate common as far as
Crum's.

Ohio slate common as far as
Petersville.

NW of Petersville, north of the school,
in a gully, and thence up the eastern
side of the gully the following section
is shown.

Massive sandstones,

37 ft chiefly covered.

13 ft Sinking shale exposed. Total
thickness unknown.

1 in. sandstone layer.

Berea and Bedford sandstones
not exposed in a recognizable
form.

49 ft 6 in. Interval chiefly shaly freestone,
Ohio black slate.

right road
bridge
200 yds
bridge road

Section of 2nd gully West of Petersville
school houses emptying into the West
branch of Kinnickinnick creek.

One exceedingly massive stratum of
fine grained sandstone.

Thin fine massive strata of fine
grained ss.

41 ft 6 in covered.

12 ft 6 in Black fissile Sinking shale.

14 ft Covered. Some arenaceous or
calcareous shales.

17 ft 6 in Bluish to buff more arenaceous
shale.

7 ft Bluish argillaceous to arenaceous
shale with an occasional calcareous + arenaceous parting.

5 in. stratum of sandstone.

4 ft 3 in. Blue argillaceous shale with
a little black carbonaceous
at base.

2 ft 6 in covered.

9 in. Soft argillaceous shale mixed
with some black.

Top of Ohio shale.

85 ft Ohio shale.

10 ft Covered.
Creek level.

A third of a mile North of Petersville,
a road turns off westward up a small
creek, and 300 yds westward forks,
one branch going up a steep hill,
northward. A few half way up the
hill, the Sumbury shale is 15 feet
thick, and is underlaid shaly sand-
stone, and about 5 feet below
the Sumbury, a 2 inch stratum is
distinctly ripple marked, probably
indicating the equivalent of the
Berea sandstone.

$\frac{1}{2}$ mi. West of Noah, road turns off
toward left, and goes down
steep hill. Here we see sand-
stone exposed at top of hill = 55 ft.
An interval of 45 ft intervenes
between this ss and top of Sumbury
Sumbury = 14 ft 6 in. black shale.
Brownish shaly sandstone with
a few ripple marks at top of 8 ft.
Interval unknown.
Above black shale not well
exposed.
Top of black shale about 110 feet
above fork junction of creek accord-
ing to estimate only.

At Glenn Springs the Silurian lime-
stone has a sort of light smoky
brown color and is 13 ft 6 in. thick,
with black clay shale above and
argill clay shale below.

A mile or one half from Glenn Springs
and 2 mi south of Escalante Spring
from base of black shale to base of
Sumbury shale = about 156 $\frac{1}{2}$ ft.
3 ft 8 in below base of Sumbury, in
Berea equivalent, a 3 in. layer of sand-
stone is beautifully ripple marked.
Below this is 10 ft of thin shaly sand-
stone and the same ripple
occurs above the ripple marked layer.
The Berea has lost its characteristic
appearance except for the one ripple
marked ss. layer.

base 5 ft Sumbury shale exposed.
5 ft covered.
16 ft whitish clay purple at top.
1 ft layer of freestone.
10 ft chiefly covered clay shale and
several freestone layers.
44 ft practically continuous series of
heavy freestone layers.
22 $\frac{1}{2}$ ft chiefly covered. chiefly clay shale
thin freestone.
1 ft thin freestone.
20 ft covered. No evidence of heavy
freestone layers.
1 ft 3 in heavy freestone layer
top of hill.

About a mile south of Nash town
a road turns off eastward, and
about half a mile eastward from
the junction the Ohio shale rests
on the Crab Orchard shale, without
the presence of any intermediate
Silurian limestone. Thin magnesian
limestone fragments are
common in the upper part of the
Crab Orchard clay.

North east of Nash town $\frac{1}{8}$ mi. The Ohio
shale rests on Silurian, from 3-15 in in
thickness, underlain by clay = Crab Orchard.

On S. side of ridge between Esculapian
Springs & Nash town, the Seneca
black fissile shale is 15 ft. feet
thick, and on this is similar
shale, 1 ft., but purplish.

Practically no Silurian limestone
between Esculapian Springs and
Bryantville, above the Crab Orchard
clay, except at locality near
to road at Nash town.

Collected West Union Cliff fossils
at the Spring on the Overbay farm,
 $1\frac{1}{2}$ miles S of Glen Springs, on Big
Salt Fork Creek road to North

Thickness of West Union Cliff 31 feet
300 yards South of Asa Carrington's house
1 mi. South of Glen Spg. same road

The West Union Cliff is exposed
along the entire Salt Fork Valley
from the foot of the ridge immedi-
ately South of Esculapian Springs
to within 3 miles of Vanceburg.
A short distance south of Valley
the West Union Cliff is so far
above creek level that it is proba-
ble that some of the limestone
elements in the lower part of
the Crab Orchard shales are
present.

City ledge on West Union
creek, $1\frac{1}{2}$ miles south of Garrison
town, $\frac{1}{4}$ mi. from Howard's store,
on Charley Ruckel's farm.

Along Limestone creek at Mayersville, 4 large specimens of *Platystrophia lynx*, the largest $1\frac{1}{2}$ inch wide, exact, were found. 275 feet south of house of Walter Sherwood property of Tom Coffman, and a little further north of house of Mr. C F Reed & Reed.

Deep RR cut $\frac{3}{4}$ mi N of Summit
4 miles S of Mayersville

2 Not exposed here.

2 ft *Strophomena encrinurus*

12 ft 6 in

Dorothyia robusta Linn.

4 ft 6 in interval

Platystrophia lynx, lone.

1 ft interval

1 ft 6 in. *Leptaena rhomboidalis*

4 ft interval

Platystrophia lynx,

5 ft interval

base of upper formation for this section

at Clarkburg chapel, in West Union Cliff = *Halygites catenulatus*, common, a *Spirifer* like *Wagonensis* but no radiating striae seen, none convex, and smaller. Also *Atrypa reticularis* Wagonian form, or other *crassa* variety, and rather small, also a form resembling *ventriosus*, also a *Cambron* like *indianensis* with about 4 plications on fold. Resembles the exposures SE of Escalape Springs. This exposure is $3\frac{1}{2}$ miles S of Vannoy on Valley road.

up gully, mostly along N. of road
 corners at Valley & then up hill along gully
 5 ft 5 in heavy shale fragments common
 5 ft covered.
 3 ft freestone, massive.
 7 in freestone
 3 in freestone, ripple marked.
 9 in freestone
 9 in weathering to shaly freestone
 1 ft 2 in freestone

81 ft covered, probably fairly accurate
 223 Chert shale certain
 22 ft covered, probably fairly accurate since
 ground is covered with shale fragments
 48 1/2 ft West Union. and fairly small
 overlying beds. See below.
 trace of measured section.

11 1/2 ft rather massive layers
 6 1/2 ft thin limestone layers covered
 22 ft shaly limestone at base, rest
 8 1/2 ft massive limestone layers

West Union cliffs well exposed
 4 miles west of Valley, at
 Harrier Hills & Fossil collection
 section of West Union measured
 on former trip W. C. Moore found
 Calymene inargens and
 Whitfieldella subidea. I found
 also Leptopora shan-shan

NE of stone at Ribolt

4 in limestone
 6 in clay
 9 in limestone
 3 in clay
 8 in limestone in several layers.
 4 ft clay
 Cloud in top.

Immediately S of bridge across Indian Run
 branch of C&O 4 mile SW of Poplar Flats,
 in road to Westover. Photo.
 1 ft 3 in Clinton base. Covered.
 1 ft 3 in Belfast, clay with a few thin, white layers
 6 ft additional Saluda clay, partly purple.
 Covered.

The limestone layers in the Belfast bed are
 whitish as the Dayton limestone. and
 these limestone layers contain Leptopora
 sinuata, near incident alis - faintly
 median depression near base.

Directly NW of Poplar Flats

7 limestone 1 ft limestone
 1 1/2 limestone 4 in clay
 3 limestone 6 in limestone
 2 ft 3 in clay 1 in limestone
 6 in limestone 1 in clay
 1 ft clay with 2 brown layers
 2 in limestone
 3 in clay
 1 in limestone
 2 in clay
 4 in limestone
 6 in gravel & clay layers
 1 ft 3 in clay, one thin limestone
 about 3 in limestone top

See last page,

8 in clay and limestone.

2 in l. with thin layers common.

8 in clay with thin l. in middle.

2 in limestone.

5 in clay.

1 in limestone.

1 ft clay.

3 in several l. layers & clay.

3 in clay.

7 in three limestone layers.

2 in clay.

* 1 ft 2 in limestone.

5 1/2 ft clay with 2 or 3 thin l. layers.

3 in more marked limestone.

Base of exposure near creek
land.

Further west, about 1/2 mile west of
Piper Flats

Top of ridge.

53 ft. Probably all West Union.

151 1/2 ft. Cretaceous.

Top of Dayton l. fully gorged
when markings as at locality
1/2 mi east of Ribault.

B.C. Griggsby
Poles

Dayton limestone is exposed about
3 miles SW of Martins. Photographed.

NW of Martins.

6 ft heavy bedded limestone.

6 ft argillaceous & thin bedded l.

54 ft massive l. Most of it un-
fossiliferous, red dish, and
sandy looking, but fossils
occur in lower 12 feet.

Top of Ridge 1/2 mi S of Carr's Station
Chert shale.

38 ft 6 in covered.

(4 ft 6 in clayey limestone. Fossils.

5 ft covered but probably similar.

7 ft 6 in hard clay, limestone, splintery.

20 ft clay shale, harder shaly at base.

limestone in thin 4 ft of base.

34 ft ordinary West Union limestone.

Belfort bed. photo. at Walter
Grooms' house. The name
has changed since geog work.

5 ft 6 in layers of m.

Clinton massive bed at base.

Belfort 3 ft 9 in

Saluda 7 ft 6 in

2 mi. S of West Union on

Beasley Fork Road to M...

Section of quarry in southern edge
of West Union, on Beasley
Fork road.

Top of section

2 ft soil

2 ft massive brownish coarse l.

2 ft " bluish l. splitting
into layers.

1 ft 4 in. massive bluish l. rather
irregular.

6 in. thin l. breaking up into
2 heavy layers.

1 ft 9 in. massive and thin,
central part cherty
and above this a cherty
nodular layer.

4 ft 7 in. massive bluish coarse
with numerous ana-
tomical. Upper surface
wave marked.

2 ft 10 in. massive bluish
coarse l.

3 ft Same as above, but with
cherty nodular layers.

1 ft 8 in. massive brownish
coarse l. wave marked
at top. Base of a poorly
but not of shale.

Bluish argillaceous capped
shales almost directly be-
neath.

at Bentonville, the Clinton
forms the summit of the ridge.

About half way between Benton-
ville and West Union there is
a small bench which prob-
ably carries the upper
shaly part of the West Union
cliff.

Loc. 1. Four miles east of Pleasantburg,
S. of Wallingford road. Black shale hill
on property of Charles Blumhut.

1 ft Black slate, probably Samburg,
25 ft shaly sandstone, probably Berea and
Bedford.

113 ft Chert shale.

46 ft red clay, apparently in upper
part of Bedford. At least no
limestone fragments visible in
the clay, and hence not supposed
to be West Union.

27 ft red clay with ferruginous frag-
ments of limestone common.

18 ft red clay with thin limestone
fragments such as are common
in upper part of Crab Orchard.

36 ft clay shale undoubted also of
Crab Orchard age.

Level of field in front of house
of John Parker.

It is at this house of Crab Orchard
could be dated in the clay for the
since Clinton is exposed eastward.

- 2) On road from Wallingford to Fox Spring,
 13 ft argillaceous shale *Cynalarga?*
 32 ft 6 in top of Brown sh. *Oreolites* thick
 9 in clay shale - *making about*
 11 in fossiliferous shale, thin & white sh.
 23 ft 9 in covered, chiefly argillaceous, *Taona*
 17 ft 6 in *sunbury* shale, *common*
 18 1/2 ft Bedford Beren - shaly sandstone
 14 ft covered, probably chiefly Bedford
 172 ft blue shale exposed
 16 1/2 ft of dark brown shale with about 20
 layers of greenish clay = *Clinton*?
 nodular clay shale
 11 ft argillaceous shale
 R. *Terrigenous* nodular clay
 layer,

||||

3) 1/2 mi. N of R & McKee, the West
 Union, richly fossiliferous and
 easy to collect, is 9 1/2 ft thick

Golden Seal or Yellow Root and
 Ginseng. at home of R &
 McKee's house, 4 mi N of Moses
 Mills.

4) At George Hammon's house, 1/2 mi
 S of R & McKee, the West Union
 photographed, is

At George Hammon.

Black Shale - thin, *Clinton*?
 limestone, massive.
 4 ft cavernous, richly fossiliferous
 1 ft 9 in *massive* sandy fine grained limestone.
 2 ft 6 in Bedford bluish gray shale,
 top uneven, showing some
 moderate unconformity.

W. of
 Hammon.

5) Two and one half miles N of Moses
 Mills, the West Union is 9 1/2 ft thick
 and consists of lower massive
 layers and upper shaly ones, fossils
 appearing rather scarce.
 just north of home of Frank Marshall.

A short distance south of home, the
 West Union all massive limestone,
 richly fossiliferous, is 8 ft
 thick.

At mouth of Anderson's Branch,
 West Union is common.

6 John Brannen 1 mi N of Moses Mills,
 Ohio shale
 2 ft shale and a little greenish clay
 shale layers
 from the purple, nearly black
 5 1/2 ft chiefly light greenish clay, with 3 or
 7 ft West Union l. base just exposed,
 this is all the West Union.

Clinton

West Union extends down as far
S as Moses Mills.

7. A mile east of Plummer's Landing
on road crossing the ridge between
clay shale, Stockton + Indian
8 in freestone creeks.
base

includes at various levels near
57 ft chiefly clay shale, with iron
57½ ft to top of Breana Vicksa freestone.
14½ ft. S. m. sh. shale.
3 ft greenish argillaceous shale with
with calcareous + prismatic
39½ ft covered partings
160 ft thin shale barometric,
9 ft Alantony
3 ft Oak Orchard

There is no West Union here.

The section base begins at house
of Basil Hinton.

RR cut south of Tunnel Cut,
Lower part of Middle Eden.

4 ft massive hard blue l. layers, ^{massive} bedded.

2 ft 3 in massive l. and base.

3 ft 4 in nodular clayey layers. Clot.

1 ft 2 in solid blue limestone layers.

6 ft 6 in nodular bituminous layers

limestone + plenty of clay

only approximate. Thin

40 ft Lower Eden measurement

Same beds well shown in next
cut northward, with in case of
beds bent on a
large scale.

Drawing = 40 ft.
One photo taken here, but not of beds.

Farther in is third cut showing
similar features.

The next 2 cuts show chiefly the
upper crossbedded middle Eden
layers.

Tunnel cut 2 photos

Pleasant Valley, just west of L + N
depot.

5 in. thin fossiliferous l.

1½ in clay parting

5 in thin fossiliferous l.

1 ft argill. shale

3 in blue l.

1 ft 8½ in soft blue argillaceous l.
Wicksa paper

1 ft 3 in massive warm colored l.
at top of Cyathus area.

Photo Paris beds immediately N of
L + N depot.

South Benson trip,

at base of Low Tracy, *Prasopora simulatrix* is abundant associated with *Rhynchotrema* in a gr. valve abundant.

Section immediately NW of Russell Mill
= old site of Wright's Mill.

36 ft *horreolis* scarce, at base,
with *Rhy.* in a gr. valve & *Hebertella*
especially in lower 12 feet.

18 ft *Prasopora simulatrix* common
Dalmanella

in a gr. valve occur in same layers as
simulatrix and *Rhynchotrema*
22 to 35. At 35 *Prasopora*

35 ft limestone with *Dalmanella* from
Bed of creek = South Benson

The fine grained limestone
up the pike less than a mile
from Bridgeport, cut a striking
strip. Next morning, before
sunrise directly above the pre-
ceding section.

Kate Williams quarry, on the Devil's
Hollow pike, about 1 mi west of Frankfort.

{ Cross bedded limestone, 4 ft exposed
presumably Nicholas member, base only
7½ Greendale member, lithologically
and formally like this member.
5 ft massive limestone, assumed to
be top of Paris bed.

Does this prove that the Greendale
member thins out westward?

At the mouth of Devil's Hollow, oppo-
site Frankfort, west of the river,
Heterothiris clytic (2 specimens) were
found.

At Hayward is located the Danville
Fire Brick Co's Enterprise Works,
a fairly large plant with the mine
entrance a considerable distance
up hill. The Maxville lime-
stone shows up a little above
R.R. level.

Deltoides ponderosa (= *lynx*)
used by Owen and Woodward
in
Researches among the Pre-Cambrian
and Carboniferous Rocks of
Central Kentucky, 1847, p. 12.

This fossil is said to become
common 7 miles NW of Bardonia
town, on the Morrisville Turn-
pike, where the blue limestone
is seen again on descending
to the bridge.
12 miles NW of Bardonia
the full section of limestone
is seen. = 170 feet.

40 ft. Flanagan
40 Paris
170 Wilmore
20 Argona
40

Acronot or Co. ←
12th + Rockwell St.
Chicago.
Ill.

C. H. Boyer.

860 Tom Storde spring.
920-910 Large *Dalmanellas* abundant
880 Large *Dalmanellas* abundant
900 *Hebertella* + *Dalmanella*
925 *Dalmanella* + *Hebertella*.
960 Level of Zac Mason.
990 Well near house 160 ft deep - 830.
950 *Hebertella* + *Rhynchotrema* common

Immediately east of house,
Callipora multitalus common.
8 ft internal
2 1/2 ft *D. multitalus* needed. *Stroph. brentianus*
Hebertella brentii. *Rhynch. irregularis*
9 ft internal.
Crossing of wagon road on the river.

At northern boundary, at *D. multitalus*
needed abundant locality, the
strata being 16 feet higher. =
Dip 16 ft south.
62 ft from road to well at Boyer
house.

146 { 42 ft level of well at Boyer house.
44 ft *D. multitalus* needed. NW of John Simpson
internal.
{ *Prasopora* from *D. almanella* very abun-
dant, 100 yds. in front of John Simpson.
60 ft internal
Tom Storde spring.
15 well east of house Boyer,
pool SW of house

Paragon. - Phillips, J. M. Beards,

From Minehead go thru first tunnel and walk to Paragon.

First tunnel is 3-4 mi S of Dry Creek.

Road from Minehead is good only as far as Soldier.

at Lawton is Sandstone quarried for glass sand.

at end of line from Lawton are limestone quarries.

Immediately N of Son's home, on North Fork of Triplett Creek, 2 miles North east of Rockville.

Sandy shale,
27 1/2 ft interval, sandy shales,
chert shales,

About 2 1/2 miles from Rockville, the interval from the chert to the Bedford is about 24 feet. at home of Noah Hall.

at Haldemans 1 mi W of Soldier, the mine has reports for clay 20 ft above the Maxville limestone. The latter is reported not over 4 ft thick. The Louisville and Portsmouth Fire Brick Co is located here. They mine the fire clay. The Tugay beds are well exposed beneath the Maxville level. It consists of sandstone interbedded with clay.

Tugay station at Lawton's P.O.

33 ft { No pebbles plant. Portsmouth, O,
glass sand, Coal Measure, as
15 ft covered,
7 ft Maxville limestone boulders.
17 ft covered.
28 ft Maxville limestone.
5 ft covered
Spring along path
84 ft.

Same locality as last,

- Base of Sandstone = Glass Sand,
20 ft Boulder limestone above the
boulder limestone of the Lawton
Sand and Supply limestone
quarry,
46 ft Limestone exposed in quarry
Top of Logan
84 ft Logan
16 ft Black Band, exposed

- C 4 ft 3 in slate colored clay or
fine clay, with siliceous
and small nodules the size
of wheat grains. A purplish
colored band just above the
middle.
14 ft Massive strata of light
slate or dark colored, some-
what crystalline l. with
a few fossils.
9 in ± bluish clay interbedded
with limestone like that
above.
6 ft 3 in Massive stratum of light
grey fine grained l. or
lithographic stone, weather-
to yellow, in some places
arenaceous.
1 ft 6 in Massive somewhat crys-
talline l.
R See 2nd page following

Lincoln Point Cut: on Monrovia
and North Fork RR 6 mi SE of Paragon.
Sharon sandstone.

- 5 1/2 ft covered.
{ 37 ft 6 in whitish limestone, fossiliferous
7 ft white
2 ft brownish clayey material.
3 ft 6 in greenish fine clay. band, purple near middle.
13 ft 6 in Massive whitish l.
1 ft thin limestone + clay layers interbedded.
7 ft 3 in Yellowish very fine grained
limestone. Poor fossils at base

Same section as above. ^{Lincoln Point Cut}

- 153 ft Sharon conglomerate. Massive
quartzose ss + congl. with white
quartz pebbles irregularly arranged,
forming cliff along the cut.
5 1/2 ft covered.
2.1 ft most exposed, massive to
medium bedded dark grey
coarse grained + crystalline
l. fossiliferous. Very fossil-
iferous 4-5 ft below top.
18 ft Covered, except for loose
block of limestone.
4 ft 6 in Coarse grained to crys-
talline dark grey limestone.
Top of cut.
T { 3 ft 6 in Massive grey l.
4 ft Massive stratum of
bluish grey, somewhat
crystalline limestone.
2 ft yellowish clay with
rock fragments probably
due to disintegration.

R

2 ft 6 in. m. arenaceous
blue shale, some l. lentils
4 ft 3 in. blue argill. sh.
breaking up into nodules
or pieces, containing
l. lentils.
5 in. blue crystall. fossilif.
m. l. stratum. not
crystalline.
4 in. Blue arenaceous sh.
8 ft 6 in. Bluish grey fine-
grained ss.

Base of exposure at
Gimchik Point cut.

at T { 3 ft 3 in. Massive grey l.
1 ft 3 in. Black chert l.
3 ft. Massive blue-
blue grey somewhat
crystalline l.

(The black chert beneath
is brecciated.)

Ry Blue Stone Quarry at
Rockville Sta. Frontline P.D.

Soil.

AB 10 in. blue fine grained ss
3 ft 6 in. soft blue argill. sh. with
some thin partings.

5 in. the fine grained ss.
5 ft 6 in. soft blue argill. sh.
CD 1 ft the fg ss.

2 ft 2 in. soft blue arg. sh. with
ferruginous nodular
strata at top

6 in. the fg. ss.
1 ft 9 in. soft blue arg. sh.
4 in. fine grained blue ss.
2 ft 2 in. soft blue arg. sh.
with ferruginous nodules

Top of quarry at me = top of
Buena Vista

5 in. stratum

2 in. parting

10 1/2 in. stratum

1 1/2 in. parting

1 ft stratum

2 in. arenaceous parting

9 in. stratum

1 ft 1 in. blue arg. shale

1 ft 4 in. stratum

1/2 in. parting

9 in. stratum

1 1/2 in. parting

1 ft 8 in. stratum with num.
m. cracks.

R

Next page.

R.

9 in ches parting with
2 in layer of ss at top
and at bottom. Top
one ferruginous

1 ft 5 1/2 in stratum.

4 1/2 in parting

* 7 1/2 in stratum top covered
with *Taraxacum*
Candipalli.

4 1/2 in parting

1 ft 9 in stratum
4 1/2 in nodular stratum
of ss. which weathers
to shale.

4 1/2 in parting.

5 in stratum

3 in parting

1 ft 4 in stratum

3 in parting

2 ft stratum

base of quarry.

Below are 3 or 4 thin
strata of ss. with considerable
shelly partings, ac-
cording to quarrymen.

The strata are all fine gr. blue
ss. with numerous *Taraxacum*
markings.

Partings are blue argillaceous
shales.

Section of hill along the
Highway running N from
P.O. at Forest me. Rock-
ville Station.

Top of Flats & Drunkenplan
15 ft soil up hill way. Con-
tains quartz pebbles
33 ft soft blue argillaceous
shale with an occasi-
onal ferruginous parting

2 ft covered

AB 11 in blue fg ss. See last
section = AB

9 ft 2 in soft blue argill. sh.
with an occasional
ss parting.

CD 1 ft blue f.g. ss. same
as CD.

4 ft 9 in soft blue arg. sh.
with 3 or 4 arenaceous
partings + 2 nodu-
lar ferrug. partings
at top.

4 ft 6 in covered. probably sh.
— Possible top of B near
Vista

2 ft 3 in. partly covered.
Some shale and fg.
blue thin bedded ss.

12 ft 6 in medium to massive
bedded fg. blue ss.
with sh. partings.
Taraxacum abundant

5

S

2 ft stratum of massive f.g.
blue superficially. The
same as lowest in
quarry of last section.

4 ft 6 in. Interval of 1 or 2
strata of f.g. blue ss.
1 ft \pm ferrug. nodular ss.
Tarnus here.

2 in shaly partings.
1 ft 1 in thick blue f.g. ss.
Tarnus abundant.

4 ft 6 in soft blue arg. sh.
with 3 or 4 shaly ss.
partings. The one near
the top = ferruginous
Tarnus here.

7 ft soft blue argill. sh.
Contact of Cuyahoga
and Sumbury.

16 ft 3 in Black fissile carb.
shale = Sumbury.

18 ft 6 in Blue Bedford
horizon. Soft blue argill.
laminous + finely lamin-
aceous shales. and
shaly or shelly f.g. ss.
cut elegantly by joints.
Lower 2 ft cont. also
1 or 2 layers of black

fissile shale,

2 ft Black fissile carb. shale.
leth. r.

18 ft 9 in in covered. Some
black sh. in neigh-
boring gully. ~~C. & O.~~

C + O RR track level

3 ft covered.
Road level.

Section of C & O R R cut,
Photographed, at the
Ky Blue Stone Cris switch.

Top of exposure but not
of formation.

11 ft 6 in. Sunbury. Black
fissile carb. sh.

21 ft Blue arg. + arenaceous
shales =
Bedford + Berea
horizon, with
shelly or shaly ss
partings apparently
ripple marked.

Base of exposure at
level of track.

Section along side of the
Eastern Ky Freestone
Cr 9 inches.

Top of Buena Vista.

25 ft Barometer. Thick to
massive lg blue ss,
with blue arg. sh.
partings as in Ky
Blue Stone Cr is gray
or continuous sec-
tion.

1 ft Soft blue argill. sh.

15 ft 6 in Black fissile carb.
shales = Sunbury.

25 ft. Bedford Berea hor-
izon, argillaceous
+ arenaceous sh.,
with shaly ss.
partings. Some of
the partings slightly
by nodular + ferru-
ginous.

32 ft Blue shale. Black
fissile carb.

C & O R R. Track.

Limestone Quarry Co.

3 mi. West of Olive Hill

R >

4 ft shales with partings of irregular l.

1 ft 3 in. Shales & thin var. l. finely brecciated, fossiliferous.

H 5 ft Thin to medium bedded compact bluish grey l.

G 7 ft 8 in Very massive and white crystalline l.

F 4 ft 6 in. Heavier and more even bedded l. very f.g and gray blue color weather to yellow

D 8 ft 3 in. Three to four inch limestone weathering nodular, especially in lower part with clay partings thicker in lower part (nodular to me. Clay = No 2 fine clay, breccia in the clay looks irregularly this basal brecciated part. This Breccia ceases up to 5 in above

C 3 ft 5 in clay, dark grey below, purplish above, with breccia common in lower 2 in.

3 in Brecciated top of same character as underlying limestone.

E 6 ft 3 in Very dense greyish brown limestone, upper layer becomes brecciated, (waved layer across the quarry,

2 ft 6 in. Very white & dense l. like Dayton l. 1-2 in clay parting.

B 6 ft 2 in White, or grey, small grained l. Base is clayey l. irregular contact

A 8 ft Bluish massive very fine grained l. Base of quarry but not of same stand

Analyses by Norton Iron Works.

of the following ledges. Only ledges 1 & 2

Silica

H = No 1.

1.80

G = No 2

.60

D+F = No 3

11.75

E = No 4

4.70

B = No 5

3.90

A = No 6

8.15

Top of exposure

R 4 ft 6 in Medium to massive bedded l. compact, chert nodules.

B Above A there is at least 5 ft of limestone. More probably the amount should be 9 ft in it case of 5 ft.

Balcanophora sublaevis
Productus citricus
D contains
Lemnula subquadrata

Linton Sta. Toga Sta.

Section of Linton Sand Supply Co.
Limestone Quarry, just below the
Glass sand quarry.

Present top of quarry.

3 ft soil,

5 ft massive grey compact l. with
residual clay above & below

F 2 ft 6 in massive grey fine grained l.

D 5 ft 9 in thin bedded nodular striae kidney
l. alternating with blue clay shales

C 6 in Fire clay & dark coarse angular l. pieces
in cement

7 ft 9 in Top brecciated & uneven, massive light
grey, fine gr. compact l. with fine blue
base is thin & crumbly brecciated in places

5 ft Massive bluish grey l. or lithographic l.

15 ft 3 in Thin bedded fine gr. grey l.

4 ft 3 in Thin bedded blue lim-
stone limestone (best and
thickest 20 ft here)

Base of quarry. Said to be
within 1 ft of Toga freestones

The fire clay is wanting here.

136

37

Loc 2.

SW end of line between Roman and
Fleming Cr. An road from Salt Lake
to Plummer's Landing.

B near Vista base.

1 ft 6 in covered

13 ft 6 in Sinking black shale

3 ft 6 in covered

18 ft 6 in Bedford Bera section top not exposed

155 ft 6 in Oliv. Black shale

49 ft 6 in Upper Goshute and

The Bedford Bera section is
indicated only by thin shaly sand
at my fragments in the soil.

The West Union is absent, con-
tact between Oliv. shale and
Goshute is well exposed.

Loc 3, One mile east of Spring Hill
in road across the ridge dividing
Brown & Planning Cos.

45 ft 2 in }
17 ft 9 in } Covered.
9 ft } Sumbury exposed.
19 ft } Bedford Borea brownish shaly ss.
Oolite well exposed.
Olin's shale top.

Loc 4, East of Farmville, up a road
not on the map.

Top of hill.
28 ft } Onychogona clay shales.
31 ft } Borea Vista.
5 ft 3 in } greenish clay and shaly sandy layers.
15 ft 6 in } Sumbury shale, complete.
16 1/2 ft } exposed Bedford Borea.
5 1/2 ft } covered probably Bedford.
Olin's shale.

Loc 5 East of McGregor's school house.

1/2 ft } Dyst. in limestone.
13 1/2 ft } Clay whitish.
7 1/2 ft } Brownish l. with Strophomena.
7 1/2 ft } whitish clay + a little Borea.
5 1/2 ft } thin limestone and clay.
Massive l. with crinoid heads.
1 ft } crinoid heads.
2 ft } clay thin, base not seen.

2 1/2 miles directly west of Plum-
Loc 6, mill in road across ridge to Hills
Borea Vista. First layers seen.
10 ft 3 in } covered.

13 1/2 ft } Sumbury. Top uncertain, probably
25 1/2 ft } Bedford Borea interval, poorly exposed.
not strict a corragy possible but
rusty brown shaly sandstone
fragments are common.
Olin's shale fragments. Highest
fragments seen.

Loc 7. At the Chalybeate Spring, 1 1/2
mi. NE of Hill Station, John
Heloison's home. The contact
of the Olin's shale with the upper
Bedford is well shown, and there
is no doubt about the absence
of the West Union.

Section of Highland Stone Co's
quarry, 1 mile E of Olive Hill.

Top of exposure.

5 ft soil
5 ft bluish argill. sh.
1 ft dark blue compact l. fossiliferous
at top.

1 ft 6 in. greenish argill. sh. in thin
agglutinated layers. (Fossiliferous at base.)

2 ft 2 in. massive hard compact dark
blue fossiliferous l. 14' of surface
very fossiliferous.

10 in. dark blue compact l.

3 ft 2 in. dark bluish grey compact l.

2 ft dark compact l.

5 ft 6 in. covered. Probably carbonaceous
Probably this part is a clay
layer.

The top surface of next lower
layer contains *Spizip*
medleyensis common. *Azaronia*
crassa. Also a large goniatite
fossil.

4 ft 6 in. Thin strata of dark argill. sh.
with some partings. The upper
part contains small
cherty layers.

3 ft 3 in. bluish sandstone argill. sh. with
partings. with some partings
stratification. *Strophomena*
johni.

6 ft 10 in. massive fine gr. bluish sh.
with cherty partings.

Cont. of next page.

5 ft massive light grey argill. sh. l.
Stylolites. *Helone*.

3 ft 6 in. Massive light grey argill. sh. l.
Stylolites. *Helone*.

11 ft Massive to medium bedded
dark colored fine compact l.
which weathers in strata
but breaks up into various
shades by bleaching.

1 ft 3 in. Dark colored compact fine l.
1 in. cherty parting.

1 ft 11 in. Compact fine dark colored l.
1 in. cherty parting.

3 ft Thin bedded dark colored massive
argill. sh. with a
few partings of cherty parting.
Probably the upper part of this
member is still in the other
generations.

Section of upper part of quarry. Exposure
shows possible thin horizon.

3 in. yellow fine clay. brecciated
with bluish green l. fossils.

14 ft 9 in. argill. sh. l. *Strophomena*
This part is badly shot up by quarrying.
Fossil plates in general.

27 ft compact l.

2 ft 3 in. massive light grey
compact l.
Dark blue.

Directly east of Wyming.

Concentric

- 19 ft. Saluda soft greenish clay top
 15 ft. argill. red. brown, much weathered
 12 ft. limestone + clay interbedded.
 1 1/2 ft. Plectambonites common
 7 1/2 ft. interval
 1 1/2 ft. Robertella insignita limzom;

(Stroph. planumbona

- 7 1/2 ft. interval with Rh. capax Strophelasma
 3 in. limestone layer.
 1 ft. interval.

(Stroph. reticulata rare,

Stroph. planumbona abundant.

- 2 1/2 ft. Stroph. neglecta + Stroph. planumbona. The neglecta fairly common
 4 1/2 ft. Stroph. planumbona. Rh. capax Stroph. planumbona common.

2 1/2 ft. Leptæna blanda in place here.

← in place.

(Leptæna caribbea in place here.)

2 1/2 ft. Stroph. planumbona.

← Rh. peramellata + Stroph. elongata.

2 ft. with Stroph. planumbona rather common.

← Stroph. planumbona common in place in a 1 inch limestone layer.

10 ft. interval with planumbona trace.

← from Stroph. neglecta.

17 ft. interval with Robertella common in upper 5 ft. lower part partly bedded.

(dorm hill

tural which may have slumped

5 ft. Palmanella + planumbona in

(compact argill. layer)

10 ft. Tetradium sinuatum common in

4 ft. argill. limestone. Platystrophia + Robertella

5 ft. chiefly coarse argillaceous thin bedded clay

15 ft. 3 in. interval. fine bedded limestone interbedded with clay shale.

Leptæna + Rh. dentata in wash near base.

14 ft 9 in. Læna, subnitida, capillacea and blue limestone - Læna brevis.

10 ft 3 in. interval. St. Cypræ common. Mt. Auburn.

Labellia diversus rather common.

19 Saluda

15 White water

31 Læna

Along RR to SE of Craig

Loc. 7

- 16 ft heavy, silty clay, argill. sh.
- 8 ft in sandy clay with fossils
- 1 ft 6 in. fossiliferous limestone
- 10 in. Stroph. neglecta bed
- 9 in. Stroph. neglecta bed
- 9 ft 9 in. in. 4' 6 in. in.
- 10 ft 6 in. in. 4' 6 in. in.

Loc. 8 Along RR to Raymont, about
one mile S of SE of Raymont

- 14 ft 3 in. yellow clay
- 14 1/2 ft. sandy shale
- 15 ft. blue shale, with 3 in. ch.
- blue shale about 1 ft 9 in.
- at base of Bedford. The
- Bedford is a bit of fossil
- bed about 1 in. thick, and
- disappears. I think the fossil
- is here through all the
- bed. Bedford is a bit of fossil
- was, and at 17 1/2 ft.

Chin. shale top at New. No. 10

Along RR to

with a lot of fossil
is, structure of ammonites
small arg. clay shale
under a lot of fossil. Large
of arg. sh. as below. Thin str.
massive ss. structure
argill. fossiliferous.
like now across the road
ft blue arg. sh. in the road
the fossil
ft blue arg. sh.
under fossil
sh. fossiliferous
ft fossiliferous. The structure
blue arg. sh.
near the road

10 ft 6 in. brown sh. structure
3 in. ss. structure
20 ft 6 in. brown sh. structure
5

Quincyville

Along Puerto Juke S E of Orange
Valley

base of Liberty bed.

1 ft 6 in heavy St. petalizing layer and

8 ft 7 in sandy clay with fossils

1 ft 6 in fossiliferous limestone

10 in Stroph. neglecta horizon

Stroph. neglecta horizon

9 in Stroph. planumbona

9 ft 9 in Limestone

Stroph. neglecta layer

Loc. 8 Along RR to Rayland, about
one mile S of Salt G. Rd. Licking River
Bucara Vista, R next page.

1 ft 3 in greenish clay

14 1/2 ft S. m. certain

15 ft Berea Bedford, with 2 inch
black fossiliferous shale about 1 ft 9 in,
above base of Bedford. The
Berea Bedford consists of brown
ish shaly sandstone, much
broken up. There is an unknown
dip here though small. The
total Bedford Berea section
may equal 17 1/2 ft.

Chert shale top at W. side No 12

S > see top of page

6 in, ss, stratum + T. acuminatus

12 ft 6 in, brownish arg. clay shale

9 in, nodular arenaceous ferrug. layer

21 ft blue arg. sh. as below, Limestone?

2 ft massive ss, stratum

fossils in partings

like more arenaceous sand

21 ft soft blue arg. sh. with nodu-

6 in, blue f. g. ss

3 ft 9 in soft blue arg. sh.

7 in, bluish f. g. ss

2 in shaly parting

6 in bluish f. g. ss. with T. acuminatus

1 ft 3 soft blue arg. sh.

K. base of Bucara Vista

Bucara Vista

of gap

Small of railroad at top

11 ft brownish arg. arenaceous shaly

4 in ss stratum

10 in brownish sh, stratum

3 in ss, stratum

20 ft 6 in brownish arg. clay shale

S

Loc. 9. A short distance east of Coney
 & north, 1 1/2 miles west of forks of
 road near mouth of Coney creek.

- 36 ft - top of hill, probably cherty
 2 in ss. weathering, shaly at top
 1 ft 2 in parting
 1 ft ss. stratum, T. acuminata
 8 in shaly ss. parting
 1 ft 11 in ss. stratum
 1 ft 2 in parting
 1 ft 4 in ss. stratum
 3 in parting
 1 ft 6 in ss. stratum
 2 in parting
 2 ft ss. stratum
 7 ft 9 in interval covered, partially clay
 & ? Lumber black shale top
 10 ft 1 in shaly, top part exposed here
 19 ft 6 in Bedford River, Macdonald
 blue shale

Loc. 10. at first trestle south of
 school house, 1/2 mi. N of
 Ragland jumping station.
 Cumberland pipe line

- Top
 6 in - stratum third of ss.
 parting
 6 in - stratum third of ss.
 2 ft 10 in Shaly arg. + a macer. sh.
 1 ft 9 in covered.
 Exposed top of Sumbury
 16 ft 6 in Sumbury, black, fissile
 carbonaceous shale, upper
 half partly covered.
 Base of exposure on Sumbury
 River R.R. at first trestle
 south of school
 house.

Loc. 11. Immediately NW of Ragland
 jumping station the heavy
 layers in the upper part of the
 Boone V. stratum come down to
 the level. There is a strong
 southward dip here.
 On Cumberland pipe line

J. M. Casselby.

Loc 12, 100 yds SW of Blackwater Station, in Morgan County,

Covered = Probably the fine clay of Paragon.

13 ft of more massive limestone. At the top this limestone is cherty, probably cherty brecciated as at Paragon.

3 ft 6 in. Thinly bedded light grey l. with thin fossiliferous chert inclusions.

3 ft Nodular = cherty limestone with Lithothamnion proliferans, ^{crinoid} Syntrochus, etc.

2 ft Fine grained compact light grey limestone with Spirifer, etc.

— A moderately unconformable contact.
2 ft 5 in. Very fine grained siliceous limestone equivalent to the bothriophyllid or yellow limestone of the Paragon section. Full of fossils here, especially bothriophyllid, ~~bothriophyllid~~ ^{bothriophyllid} a few. Full section not exposed here.

1 ft 7 in Covered.

At. treasale 119, a short distance N of Y switch, 1 1/4 N of Blackwater Station (grained).

5 ft. Limestone blocks, medium (at "Limestone" quarry, equivalent to thin bedded layer brownish yellow. Possibly 2 ft 4 in. very fossiliferous, weathering 2 ft 7 in. greenish + purplish fine clay.

11 ft. More massive l. with black brecciated l. at top. 12 ft further north.

4 ft 7 in. Thinly bedded light grey l. with fossils.

2 ft 6 in. Nodular l. with ^{crinoid} Lithothamnion, etc. in layers, (= 3 ft thick further north).

1 ft 9 in. Thinly bedded light grey compact, fine grained fossiliferous.

4 ft. Massive bedded bluish grey fossiliferous limestone with no yellow.

9 ft 6 in. covered, Gorking river.

Cross off the black brecciated layer above the fine clay at Paragon. It occurs below, not above the fine clay.

On Morgan, on the S. side, the
 48 feet above the Buckling river.

On the road a quarter mile east of Oak
 on a bend of the Chatham road in a valley
 NE of the road to John Creek the water

yellowish-brown limestone
 2 ft 6 in "Marble" of the greenish light
 4 in green soft clay.
 15 ft 2 in cherty, crinoid.

13 ft 2 in light grey limestone, top
 ledge thin frayed stratification
 2 ft nodular cherty limestone
 with one nodular part showing
 a sign of a type of cherty limestone
 2 ft light grey limestone, top
 varying thickness, some
 cherty but some smooth on sides
 on outside.

4 ft dark blue to the light grey
 limestone but weathering to
 a light brown limestone
 which is the same as the
 one at the top of the road.

Mounty road leading S. along the ridge
 one mile west of S. Mount on the
 There evidently is a strong uncon-
 formity between the Harriet and
 the underlying strata.

high cliff
 25 ft 6 in cherty limestone
 covered.

19 ft 2 in light grey limestone
 4 ft covered.

Coal Blossom.
 12 ft 7 in covered.

3 ft - thin bedded light grey limestone
 3 ft 10 in light grey limestone, thin bedded limestone

2 ft 3 in nodular limestone with little
 cherty.

1 ft 4 in thin bedded light grey limestone,
 mostly covered.

6 ft light brown limestone with some yellowish
 4 ft 5 in covered.

1 ft 5 in brownish grey shale.

E) B. Johnson's Camp. NW of Creston
State no. exposed along Comp. Rd.
15-20 bushels corn. Soil 2000.
Reached by Charles Jones.

F) Section one mile east of half
mile of Creston station on
the C. & R.R.

- 4 ft Blue shale.
- 2 ft Duffon layer. Rather
thin bedded light brown
brownish red. The same
bedded toward the top.
Top of Duffon limestone.
- 2 ft stratum of light brown l.
with chert. red mottled.
- 1 ft 3 in stratum light brown l.
fossiliferous.
- 2 ft 6 in stratum light brown l.
4 in chert in irregular flat layers.
- 4 ft 6 in massive irregular bedded
light brown with 1/2 in
+ cyathophylloids, coral.
10 in greenish brown dark sandy
stratum with small black
phosphatic nodules + fish
teeth + plates.
- 7 ft 6 in coarsest soft blue arg. shale.

State Creek Dam Co. X
1 1/2 mi. NW of Olynthus, east of road
east of Olynthus road.

- 12 ft red sandstone.
- 6 ft blue arg. shale part.
- 6 in red clay shale.
- 2 in black arg. shale.
- rest black & clay shale.

25 Bush Thomas Land. Corn field
30 bushels corn. No fossils layers.
Good soil.
Beyond, 2000 ft from
Thomas is a hill crest.

H. About 2 mi south of Olynthus on
Olynthus road.
10 1/2 ft "black arg.?"
No trace of l. or limestone
rest black & clay shale.

Phosphatic nodules occur in
arg. about 500 ft up. No fossils
seen. In 1/2 mi. south of
Olynthus, about 1 1/2 mi
N of half mile place, near
Olynthus road. X

1/2 mile NE of Rothwell, in road to
 Frenchburg
 R > 4 ft 6 in light grey l.
 { Lithothamnium & Syringopora
 3 ft 9 in nodular cherty l. with both species
 9 ft massive nodular light grey l. cherty
 1 ft 2 in thin bedded light grey limestone
 4 ft yellowish limestone with strata
 { It may belong here somewhere
 2 ft light grey cherty thin bedded limestone
 { upper stratum apparently finely bedded
 4 ft yellowish l. rather massive strata
 1 ft 6 in covered
 11 ft greenish clay, top of road only

No ss. seen here. Not exposed

Top of road section

27 1/2 ft shale

finest top

2 ft sandstone with thin ferruginous

15 1/2 ft shales with ferruginous nodules

20 ft limestone scabrous forms

11 ft covered

Is bedded sandstone

4 ft 2 in bluish grey cherty l. thin layer

R >

1/2 mile West of Frenchburg boundary line
 on the road from West 24 along &
 extends to Rothwell & Frenchburg

22 1/2 ft 5 in layer ?

2 ft clay shale brownish
 cherty shale

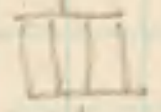
The Gravelly is splendidly exposed
 east of the county line, less than a
 mile eastward

One mile from Rothwell, on road
 to Frenchburg, the limestone
 section is 30 ft thick above the
 thick bedded limestone layer.
 The rest of this 30 ft section, for a
 distance of 5 feet is covered. The
 first limestone is white, and
 contains small quartz fragments,
 up to 2 1/2 in diameter. In showing
 up of shales up 35 feet above
 the limestone

Ky Central Natural Gas Co's
Pumping Station, in
Hankins Branch.

250-300 Cuyahoga

about
200 lb Black Slate

gas  Devonian limestone sands
Crab Orchard

50-100 leaves per year for
each producing well.

Frenchburg - Salem church
state
en route from Maitland to Jeffersonville,
about 2 1/2 mi E of Jeffersonville.

at roadside NW of E.C. Fugate's house,
13 ft 2 in. soft blue arg. sh. with ferruginous
4 in covered, apparently shale, nodules
blue compact calc. ss, weathering to flint
3 ft 8 in ferruginous shale at base, nodules
4 ft 4 in soft blue arg. sh. Base of Berea

Shirley shale top

E.C. Fugate's land, on branch 200 yds S of

10 ft Shirley shale.

4 ft 10 in Berea Bedford, thin hard clay sh.

18 ft 6 in blue shale.

Bed of small branch
about 300 yds S of falls on state road,
small

Half a mile south of state road,
past Mr. E.C. Fugate's house,
where there is Berea Vista ss in the road
bed at head of gully.

4 ft 3 in Berea Vista ss, base not certainly
5 ft 4 in covered, seen

1 ft blue green argill. shale.

8 ft 9 in Shirley shale.

Top of Berea Bedford

Not Devonian N of Alynfwa Lane,

Loc R. along highway south of state
Road, between Frenchburg & Jeffers-
ville, $\frac{1}{2}$ mile east of Slate creek.

2 ft 10 in. Massive ss stratum. Tan color.
2 ft 3 in clay shale
11 ft — Sumbury shale dark
4 ft 2 in Bedford-Berea arg. shale, hard.
31 ft 6 in clear shale.

On Clay City road 2 miles SW of
Jeffersville, at crossing west of
Fork of Sycamore creek,

5 ft — Normal clear shale.
rock weathering to broken shale
11 ft 6 in undulating massive argillaceous
6 in Duffin layer.
3 ft 2 in Devonian? limestone, siliceous
11 ft covered with a little Silurian
clay at top,
2 in stratum. light brown limestone.
8 in { ferruginous layer in white pebbles
{ fossils few
{ brown and ferruginous red.
8 in grey l. weathering to light
1 ft strong light brown limestone with
large chert nodules
strongly wave marked.

Loc. M. 100 yds NW of forks of Levee⁺
and Clay City roads, about 4 mi.
SW of Jeffersville.

R 11 in Bena Vista (Phosphatic?)⁺
3 ft 8 in clay shale
6 ft 6 in Sumbury shale.
2 ft 2 in Bedford-Berea argill. shale.
38 ft Clear shale
Brush Creek.

R this is the big nodular layer seen
SW of Olympia. in the fossils
Olympian Spgs to Preston.
It also has great big nodules⁺
in weathering here.

{ on road to Keadville.
{ About $\frac{3}{4}$ mile west of Levee
Normal clear fossil shale.
5 ft 6 in The so-called Olentangy layers.
5 ft 6 in Pure massive clear black
shale. Much more fissile
than usual.
Devonian limestone.

8/11/15 Schubert Hotel

14/4 2 in. White water bed, 2nd water.

$$\frac{12}{2} = 6$$

26/19 1021

20 Apr 84. 1st Year

~~Mosses & Dr. Sanger~~

17 ft 3 in upper part of Hagerman. The exposed in
thin bedded. Third part east of Westgate house.
Lower part of the 2nd & 3rd.

32 ft. ~~probable~~ ~~of~~ ~~some~~ ~~Wagners~~ ~~will~~
~~thinner~~ ~~exposed~~ ~~in~~ ~~front~~ ~~east~~ ~~of~~
~~bedded~~ ~~Humboldt~~ ~~conc.~~ ~~Lower~~ ~~3 ft~~
~~not~~ ~~taken~~ ~~in~~ ~~photo~~ ~~graph~~

2 ft 6 in. Stage 11. Limestone layers, corals
passing to the same granitic
layers along Bay River in North
Carolina.

5/27/31

157

15493

27

13 / 14

Copy
through copy. On bubble with

137

$$\begin{array}{r} 16' \quad 6'' \\ 39' \quad 6'' \\ \hline 56' \end{array}$$

$$\begin{array}{r} 8 \\ 14 \quad 2 \\ 39' \quad 6'' \\ \hline 61 \quad 8'' \end{array}$$

$$\begin{array}{r} 64' \\ 47' \quad 6'' \\ \hline 16' \quad 6'' \end{array}$$

Hornback curve section
 Clinton

The section
 at Hornback curve includes
 strata from 47' 6" in
 massive l. R. to top which is
 base of massive l. R.
 of Hornback curve includes
 20 ft 8 in to 35 ft above base
 layer called R.
 28 and 31 ft above massive l. R.
 strata is from, portion of head
 13 and 21 ft above massive l.
 5 layers of massive, Rhynch

The strata of massive, follow
 layer in bedded. In 2nd cut. All
 in part - 2 ft of overlying stuff,
 l. R. in photo 3rd cut. from 30'.

Hornback in 3rd cut 30' from
 2nd cut. In photo 3rd cut
 from 10' up to 15', Rhynch
 cut 11 ft high back. From 3 ft
 above Rhynch.

Case of massive l. R. cut from
 by layer of Rhynch. at top
 line, fig. d. from 10' to 15' - 20'
 Rhynch. - 9 ft above l. of
 Rhynch. and, Rhynch. is all
 at 10' above Rhynch. from 10' to 15'
 as at top Rhynch.

3 ft. Plat. layer - l. R. Not attached to
 this level. Possibly, Rhynch.



$$\begin{array}{r} 16' \quad 6'' \\ 39' \quad 6'' \\ \hline 56' \end{array}$$

$$\begin{array}{r} 39 \\ \hline 56 \end{array}$$

56

$$\begin{array}{r} 8 \\ 14 \quad 2 \\ \times 39 \quad 6 \\ \hline 61 \quad 8 \end{array}$$

$$\begin{array}{r} 39' 6'' \\ \hline 61 \quad 8 \end{array}$$

61 8

$$\begin{array}{r} 64 \\ 47 \overline{) 16} \\ 16 \\ \hline 0 \end{array}$$

47

16

1. Horizontal curve rectified in
alignment

6-17 S. alba

~~14/15~~ in White water

Exposure at Horseback camp includes

Upper Liberty State 47/6

above impossible. ER to top which is

6 4 ft above water in G. 200 ft. R.

C. 7 I. West of Thompson's bridge in clades

20 ft 8 in to 35 ft above water

2. *L. longior* collect R.

~~Billed~~ 29 Feb 31 Lt. John W. ... R.

~~5 Yersinia. pathogenic is found, but not of 4 and value.~~

~~Between 13 and 21 ft above sea level~~

collect $R = \text{Staphylococcus aureus, P. aeruginosa, P. fluorescens}$

39/4 6 in. 2 in 2 in 1 in = Staphy. *Staphylococcus* *fulvus*!

~~Lizard & Cat in the Garden, Dec 2nd cat All.~~

included 2 ft. to 2 ft. of overlying strata.

$\rho = 2.17$ massive ℓ , ℓ in pair 3^{rd} cut, $\rho = 2.17$

17 ft 9 in, approx. 18 in. - 30 in. of 1/2 in.

~~Leafy green plants~~ not in plant by themselves

32 ft. *Weddellia* *Lucina* *argentea* *ville*, *Fluviatilis* *ville*

~~Box 4th C. T. H. R. B. L. B. Brown 3 ft~~

~~out in the field~~ ~~Mr. Frasier~~

~~2 ft 6 in. Occasional in Cordero - Chamae Bay area, Cordero - San Diego~~

~~It 200. By 1 Canyon of the White Scott N. 3~~

~~4 ft 9 in dark blue arg. l. green - light blue - white~~

[Faint handwritten notes at the bottom of the page, mostly illegible.]

[illegible]

13. It is proposed: as all King's College?

1. Introduction

3 ft. *Plat. long. lvs.* Not at all like blue

Hyd. Derale - Dec 24th, 1892

One mile from Indian Field
in the road on road head-
in a west of road 3/4 mile SE of point
where road 3/4 mile SE of point
where road 3/4 mile SE of point
where road 3/4 mile SE of point
where road 3/4 mile SE of point

9 ft 3 in. Limestone clay,
2 in. Brown sand,
1 ft 5 in. slate
2 in. clay shale
Calcareous shale (cut out)

One same road as preceding
3/4 mi. from fork, a short
distance N of where the
Cypress creek road turns
off.

6 ft 6 in. Limestone
2 1/2 in. 3 in. Brown Bedrock
The basal part dark
blue & white, fossiliferous
Calcareous shale

Stanton Hwy.
Section in highway which ex-
tends up Moras creek, one
mile + above Red River Iron
bridge, at northern edge of
Stanton.

16 ft 6 in. Blue argill. shales with
layers of ferruginous
nodules,
2 ft 5 in. Bluish compact nod-
ular stratum of calca-
reous ss. City ledge.
3 ft 9 in. Bluish arg. shales
Brown V. strata
4 ft Black fissile carb.
shale, Sunbury No base
Base of Lybrand.

Section of hill along high-
way at the head of Morris
creek, hill is called Morris
mountain. About 3 miles
N of Stanton.

Sharon conglomerate

Top of exposure near top of hill.

70 ft. Mostly covered. Some
light grey limestone blocks.

32 ft. Mostly covered. Some
rather fine grey ls.
which weathers yellow.

67 Practically covered.
Some shales and 2 or
3 thin ss. layers,
Grogan.

39 ft. 6 in. The two or three
top strata calcareous
fine grained buff ss.
with not distinct bedding
planes but apparently
massive, and which
weathers to thin shaly part
fossiliferous. *Tarmonia*
Candagalli.

24 ft. Massive blue grained
buff ss. with covered inter-
vals, and shaly ss. be-
tween. *Tarmonia*.

(370 ft Barometer, mostly
covered. Some arena-
ritic shales. SW corner
100 ft Barometer. Mostly
covered. Arenaceous
argillaceous shales.
City Gledge.

Black shale?

Section of Lane leading
to road bridge of Lewis
Foulkner, 1 mi NW of
Stanton.

8 ft bluish shales above
1 ft 3 in. Buff fine grained
stratum of calcareous
ss, weathers
into large flat nod-
ules, City ledge.
2 ft 11 in. soft blue argill. sh.

6 ft 5 in. smoky sh.

7 in. Bluish arg. + calc-
careous shale, Ben-
ford area,
16 ft 6 in. chert sh.

Base of exposure,
19 ft 9 in. covered,

Highway level at the
lane.

Section good.

Red River Water Mill

2 1/2 miles east of Pashya station
just below Mill dam on Red
River.

Top of exposure along river bank
6 ft 6 in. clay in same formation
6 ft 4 in. sandy clay in same
3 ft 5 in. sand at base of same.

1 ft. Canebrake, fine grained, base
of same exposure to phosphate
and fossiliferous nodules,
bed of Red River below
the dam.

Mathews & Walker's party.

14 ft WX contact
29 ft St. Lawrence
1 ft 2 in 3 in clay
+ { 25 ft 3 in St. Lawrence
10 { Littleton in layer not seen
10 { 25 ft St. Lawrence at 1st 03 bridge

Marble and Wilson's quarry
Leighton & Co. Inc. Port of
of North Carolina State and route

R2

18 ft massive ls. white to sh.
1 ft 8 in fine clay grade + red purple
12 ft 6 in ^{very} fine grained white to sh gray
It varied one with one sheet
Layer 1-4 to 5 in from top
2 ft 2 in water line, occasional layers
4 ft 3 in similar next to overlying
layers but not so dark and
showing striations, catenation
But finding a large mass
one bed.

4 ft 4 in Massive white limestone
2 ft exposed at edge of quarry
2 ft Limestone layer with chert
regarded as Lithothamnion layer
4 ft Limestone. Formerly more was exposed
6 ft Medium bedded compact green
8 ft 9 in green argill. shales. Thin
masses 3 ft 3 in of light green
color & present thin layers
zones of dark so. present throughout
thin limestone
2 ft Thin bedded argill. & limestone
1 ft 4 in Massive white limestone
thin shaly parting
2 ft 10 in Massive yellowish limestone
1 ft 9 in Thin bedded greenish argill.
with some chert

Minerva NE of Irvine Court house
 1 ft Yellow l. base of St Louis 1 ft.
 Logan 60 1/2 ft covered chert
 17 ft Rather alaly phos
 24 ft More micaceous phos
 17 ft ss, fine, with many shells
 16 1/2 ft bluish, micaceous, indurated phos
 6 in ss, with ferruginous nodules
 69 1/2 ft More indurated arg. shale with
 ferruginous nodules of various sizes
 5 1/2 ft soft argillaceous shale
 with ferruginous nodules of various sizes
 1 ft possibly a ss, 1/2 in thick
 1 ft bluish shale with small shells
 5 ft greenish shale, somewhat indurated
 1-2 ft more indurated argillaceous shale
 Cornville 1 1/2, ledge horizon
 6 ft 6 in bluish green argillaceous shale with
 small nodules of iron
 3 ft S. sanding black fossiliferous shale, probably
 4 in more indurated, including 2 layers
 2 in argillaceous shale with fine nodules
 nodules 3-4 in diameter
 3 in fossiliferous argillaceous shale
 6 in dark argillaceous shale with argillaceous
 nodules and fossils
 2 in grey calcareous fossiliferous sandstone
 with abundant fossils
 5 1/2 in grey calcareous fossiliferous sandstone
 shale with numerous fossils
 near road etc.
 94 1/2 ft bluish shale, fossiliferous

Blue
 17 ft

370 ft

Cornville

13 ft

② Monahan quarry
 Spotted with light spots
 12 ft 4 in. light grey l.

S <

Second quarry level
 layers, good for lime. Forms
 7 ft 4 in. Hard cement in horizontal
 (with a few small pieces of
 glass in situ) which may be
 or less related to the next thin
 in large scale and more

8 ft 9 in. Massive light grey l. crystalline
 1 ft 2 in. light grey l. < thin of mass
 1 ft 1 in. light grey l.

* 8 ft 4 in. massive light grey l. with
 large sheet masses

1 ft 4 in. light grey l. with thin cherty layers
 (thin and best lower layers crystalline)

1 ft 4 in. light grey l. thin layers interbedded
 with thin arg. layers.

Spalling badly.

3 ft 2 in. Massive yellowish l. very fine grained

6 in. yellowish f. l. splitting into 2 strata

7 in. More yellowish f. l. splitting into
 several layers.

1 ft 2 in. yellowish f. l. spalling, coarsening.

1 ft 6 in. yellowish f. l. massive.

8 in. greenish brown f. l. crumbly.

7 in. yellowish brown f. l. crumbly.

9 in. Yellowish paper strat. fine.

medium grained l. distinctly porous

9 in. distinctly brecciated layer.

1 ft. fine grained light grey massive l.

6 in. greenish algal strata

9 in. massive light grey l.

S <

Monahan quarry,

①

R >

3 in. yellowish soft l.

5 in. yellowish f. l.

1 ft 11 in. yellowish f. l. massive l.

1 ft 7 in. yellowish hard medium grained

1 ft 2 in. yellowish l. spalling.

2 ft 3 in. Logically shale

Spring level, 1 ft 4 in. west of
 quarry

shaly sandstone + shaly
 6 ft yellowish brown and brownish
 1 ft clay shale
 1 ft yellowish brown and brownish
 27 ft 6 in shaly sandstone and shale
 Top of exposure at the quarry
 33 ft limestone, covered at bottom by
 12 ft medium gr. whiteish ls
 * 1 ft 3 in 2 in thin limestone interbedded with
 gray clay = R. interstrata base.
 (can drill good to quarry into layers
 but, numerous massive masses,
 weath up into horizontal layers)
 20 ft 11 in massive grayish ls, about
 medium gr. and fairly hard.
 { Rather fine grained
 4 ft 6 in { Massive very hard ls. breaking
 up into several horizontal layers.
 * 1 ft 10 in greenish fine clay layer
 2 ft 2 in very fine grained light blue
 blue calcified ls.
 11 in light brown medium gr. ls.
 5 ft 4 in whitish medium grained ls.
 { breaking up irregularly into horizontal
 2 ft 3 in light blue medium grained ls.
 8 in light blue medium grained ls.
 { 1 to 2 inches thick
 10 in thin layers of limestone, white
 6 ft 9 in white ls. medium gr. and
 breaking up in descending order
 into 20, 26, 8, 2 and 25 layers

S

46 ft 3 in R. arkaotica.
 25 ft 5 in St. Genevieve.
 1 ft 10 in fine clay.
 37 ft 1 in Upper St. Louis
 8 ft 4 in Cherty ls. (Gottschalk's layer?)

Archimedes 5 ft below top of R. arkaotica.
 Pentamerites 9 ft " " " "

B. Ozarkensis common

ls. with small Pentamerites, especially
 small ls. and small goniat.

Immediately S of Westerville, 200 yds
south of Humphrey Park, is a thin layer
of gray shale, common only about
20-30 feet above creek level.

About 1/2 mile south of Westerville,
on Liberty road is a thin layer of
shale, common near West of Liberty.

About 1 mile before reaching Ridds
at the a short distance beyond Joe
Snooks place, the cross-bedding and
layers occur on the lower hillside
but the shale is common only
is found at creek level.

Along Tracy's creek, 100 yds N of Ridds
stone, the Devonian rock upon
the edges of land, in a shallow
layer on the edge of a hill, it is
common. The shale is a dark gray
rather crumbly but very thin
layers are common. Along the
creek, the shale is a dark gray
at one place, a fragment of a large
fossil, a very short, thick, conical
fossil, the top of which is
conical, larger at the base of the
Devonian and 8 inches thick.

East of Humphrey Park, 200 yds
from the 6 mi. W of Liberty, is a thin
shale, rests on a great thickness of
sandstone, forming a claystone rubble.

In a steep gully, N of road
West of house of John Brown, 3 mi NE of Liberty
Module of base of Cuyahoga
38 ft. Oliv. shale. (S. Smith?) Locals
65 ft. laminated. Unfossiliferous
and is as common as at West
Liberty.

At the base of the Oliv. shale there
is, in descending order
5 in. arg. shale, greenish
6 in. shaly sandy rock. This
leaves for the Oliv. shale section
a thickness of 37 ft 6 in. The
underlying part is phos. sh.
especially the upper part, and
was frequently faulted along
the Cuyahoga and River.

100 ft N of road, second gully, E
of house of John Brown, 1 3/4 mi NE of Liberty
D.K. of section,
1 ft. Oliv. shale,
5 in. greenish arg. sandy claystone
27 1/2 ft. Devonian, clay rock cracking to
rubble, not fossiliferous.
Common
large masses of tabular, rounded
14 1/2 in. Tetradium, small abundant
of the same
The lower part of the section is
columnar, a large, flat, conical
on large.
Middle section and base
about 30 ft. unfossiliferous, lower part
is a clay west of house of George Brown
on Liberty road, 1/2 mi. E of house of John Brown.

1 1/2 mi.
East of
Liberty

Rock
Store

Champion

Corals

2 1/2 miles W of Liberty in the
Green River valley the Libertia-
Kunkin zone. It is a very thin
zone with a few corals.
The hill top of the zone
reach the St. James

Two miles further west the
Libertia cut shows several
concentric layers full of
crinoid heads and a few
specimens of *Pleurodonta*
were

Along road from Danville along South
side of Green River, 100 yds west of Pelley
cemetery, 2 1/2 miles west of Danville.
Chalk shale, 1 ft. exposed. It is sandy
near by at base, merging into a
sandy limestone varying from
dark grey to nearly black. It has
various stems and calyx
spines >>> rock.

3 to 4 1/2 in

The top of the underlying formation
light grey limestone has con-
tinuous *Dolot* various stems
of considerable length and
this rock undoubtedly
belongs to the same
rock as that exposed
in the Green River 10 miles south
of Longwood.

On Columbia & Stanford road.

3/4 mi West of County Line, at
creek at corner of John White Powell
in road west of Dorman L. on S
side of Green River

2 ft 6 in Black shale

Sandstone phosphatic nodules.

8 in Black shale

53 in chert layer

It is very much phosphatic nodules

37/16 in Black shale fossils,

6 in to 12 in indurated Black shale as at
base of chert shale section below

2 in chert layer with Jeffersmithia

6 in Sandy chert with blackish
limestone in the Deltoceras
stems, also in the chert

3 ft 6 in Fossiliferous, very hard, bluish
limestone, a greyish blue, weather-
ing to brownish. full of Deltocera
cerata stems and a few by the
thylacoid, also a few
large Favosites.

at Short creek, east of creek,
along road. 1/4 mile N of
County Line. 1/2 mile N of Dorman creek
Base of Conglomerate with phos-
phatic nodules

2 ft Black shale

phosphatic nodules few

6 in Black shale

phosphatic nodules some clay
stone

38 ft 6 in Black shale

2 ft 3 in chert with small Favosites

Black shale

2 ft Black shale

6 in

phosphatic nodules

phosphatic nodules some

22 ft chert shale

11 ft chert

5 ft 6 in

chert shale, lower part indurated

2 ft 3 in Dorman L. with Deltocera

chert, Deltocera phylloides, a
large massive Favosites.

Strophomena albertensis *Strophomena*
Strophomena

Bysso-myelia radiata

Platystrophia

Ammonoidea gigantea

4 mi. S of crossing of Danville-
Columbia road over Danville creek,

Chlorine shale.

4 in. Indurated base of Chlorine shale.

1 ft 5 in. Dark sandy limestone with *Dalmanella*
and small *Strophomena* fossils.
This is the sandy limestone between
here and Danville, & is divided
in fine bedding.

1 ft 4 in. limestone, hard, fine grained,
with *Dalmanella*, grayish blue.

2 in. shaly limestone.

1 ft 6 in. limestone.

3 in. chert horizon, probably base.

1 ft 2 in. cherty limestone.

4 1/2 in. limestone splitting into irregular
layers.

4 1/2 in. cherty horizon, probably base.

1 ft 4 in. massive strata of limestone.

6 in. parting, probably shaly.

Dev. weathers out.

7 in. greenish arg. clay shale.

1 in. fine grained hard sandstone.

same as above.

near base of Richmond and section
at numerous localities SE of
Gotham, south of Bridge and
thence as far as Shelby City.

5 in. greenish arg. clay shale.
2 ft 6 in. Stratum with argillaceous lime-
stone in irregular layers in argill.
lucens arg. All but upper 6 inches
rather highly fossiliferous. Fine
molding most of the fossils at this
locality.

1 ft 8 in. clay rock, shaly, with
fossiliferous limestone in upper
6 inches of stratum.

5 in. shaly limestone, weathering into
small fragments.

8 in. arg. limestone.

6 ft. arg. rock splitting into irregular
thin layers, and weathering into
small fragments.

4 ft 6 in. covered.

Danville creek.

Indurated base of blue shale

half and in top 2 inches

with crinoid stems in turn

1 ft 5 in massive dark blue limestone,
at various levels

5 ft 5 in massive dark blue limestone - B
large.

2 ft 5 in fine grained dark blue limestone
8 in fine grained dark blue limestone

at top, Halysites,
with dark blue fossiliferous

1 ft 8 in massive appearing layer

1 ft 9 in covered

4 ft 6 in grey limestone, weathering shaly;

11 ft 2 in covered, D

2 ft 9 in dark blue weathering rather shaly

2 ft greenish grey layer, Lophospira at E
lithology, dark blue dense l.f.s.

1 ft several fine grained blue limestone
layers with small good exposures
dense blue l. with small vertical
worm borings

B. with Syngonina and Favosites
with colonies 3 to 3 1/2 in 1/2 inch

C. with Halysites Pterinea strobilata

E. with Platystrophia a large large
3 feet more

About 1 1/2 miles S of crossing of road
over Dawson creek. 2 mi N of home
of W J Withers

In D the covered section,

3 ft 9 in covered

4 ft rather than greyish blue, with
clonings

1 ft 3 in massive f.g. l. with vertical worm

1 ft 6 in covered,

6 in fine grained blue limestone
with rather thick shaly layers
in lower part.

2 1/4 mi up the creek, the indurated
base of the blue shale, east directed
in dark blue limestone with
D. latavians.

At the Fish trap - probably the blue
shale rests on Dev. limestone
up which a 15 in. layer is exposed.
Base of section.

Top of hill
The base into which it lies
133 ft. practically merging near
thinner than underlying part
ish clay shale, thin, thin,
31 ft 3 in. Moderately indurated, green
37 ft 6 in. 2 ft. changes place - Limestone
in clay layer.
at base of section, zone 3-4
6 in. abundant phosphatic nodules
23 ft 3 in. Black shale

Crack level
Nodules at base of Limestone
1 ft 4 in.
nodules, phosphatic
9 inches indurated black shale
nodules, phosphatic
21 ft 2 in. clay nodules

Section NE of Fish trap 100
yds. north of Casey Creek
Nlatville - Kniffen
over Casey Creek

Collected abundantly 2 miles
West of Kniffen, at home of
Riley Clumby, at top of ridge
from Sperry, underlying layers
with numerous fossiliferous
Worms, even clay with
germanium nodules.

2 ft Sperry with numerous fossils
collected, granular limestone
may be thicker than 2 ft but
only this 2 ft observed, top of hill

2 ft Massena darker blue, very fine
granular limestone with green
fossils very abundant

5 ft Cherty shale with two spec-
ies of Spirifer, cornucopia
the shells of the fossils to feet. Abundant
and heavy.

Clay with large thin weathering
to clay, with quantity of small
cylindrical nodules, probably
at least 5 ft.
Rest of the section with the
massive

Dimitta is quite directly north of
home of William Small's house, $\frac{1}{4}$
mi. South of Acton. The stone
point is at Small's H.

River side consisting of about
30 feet of the bed exposed along
old Springfield road but near
1 $\frac{1}{2}$ miles south of mouth
of William Creek.

at home of Pinckney Cox about
2 $\frac{1}{2}$ miles S. of Merriam on
road following eastern base of Peck
Creek and thence down a slate
creek (also called) westward to
R. H. Mason's creek. The horizon
at the mouth of the slate creek
here the section is

White slate

2 in sandstone with nodules of
4 inches thick along the
outcrop and at the level
only there to be found
2 in hard, light colored sandstone
to 10 ft. thick, and
stone bluffs on the west
5 ft. of light colored, hard sandstone
with nodules of 4 inches
thick, and at the level

On road from Merriam to
Liberty, about 4 miles from
Merriam, NE of Peck P.O.,
about $\frac{1}{4}$ mile, on McClure's
fork of Carey Creek, on land
of Mr. Overstreet is rock
below the Black slate
according to citizens at
Merriam.

300 yds North of Durham's place
at Merriam, on Whippoorwill
branch of Robinson Creek, a short
dist. once south of branch of James
Sawyer.

47 ft - Chlor. shale
11 in - brownish argill. base of Chlor. shale

1 ft 7 in (the top of the 1 ft 9 in) of massive
Layer of Devonian limestone
Contains various fossils including
1 ft 6 in brownish very ferruginous sandy
shale.

1 ft 6 in thin bedded arg. Bed. is con-
sidered one of the best for
this class. The top 14 in. is
highly fossiliferous, the layers
beneath the top 14 in.
above the top 14 in. are

The Devonian limestone is exposed
up this branch near the mouth
at the house of Mr. W. H. H. H.
Fossils of this period have been found
this locality were collected.

Devonian limestone at
and large fossils?

100 yds NW of Peck, on road to
Merriam, directly west of house of
Mr. Martha A. Tucker.

Top of exposure

3 ft 3 in (Chlor. shale)

5 to 6 inches brownish ferruginous
sandy stuff belonging to base
of Chlor. shale.

14 ft - bedded
argill. limestone as at
Merriam.

A quarter of a mile north of Peck,
directly opposite the house of Mr. H. H.
Overstreet, in bed of McClone
branch of Robinson Creek.

Chlor. shale with sandy
limestone lenses 2 in thick at the base of the
4 in Chlor. shale base of Chlor. shale
and a 3 inch layer of similar
sandy limestone at the base,
belonging to the Chlor. shale section.

6 in Devonian limestone strong blue

medium greenish
9 in Dev. L. strong blue, thin bedded
fossils.

A mile and three quarters from River
Branch P.O., about a mile south of
South Fork of Rolling River, at the
first clear shale outcrop where a creek
crosses the road. (Chert fossil shale)

6 in fossil black arenaceous shale
2 ft black fossiliferous shale
3 ft 6 in covered

1 ft 2 in green ls. with large bryozoans
fossils of bryozoans & 4 in covered
1 ft thin bedded ls. with bryozoans

8 ft thin bedded ls. with bryozoans

1 ft thin bedded ls. with bryozoans
6 in fossiliferous ls. with bryozoans
& Platystrophia

19 ft 9 in thin bedded ls. with bryozoans
in western part of Rock section

Top of section is covered by
loose 13 ft of ls. with bryozoans
& bryozoans of about the same
kind as the bryozoans seen
See Camp but not 200 ft
75 ft

About 200 ft south of the
the Mary McApparail road, in the
portion S. of the Henry Mount Road
bryozoans occur in the creek along the
road side, about 60-80 ft from
small bryozoans, bryozoans
fossils. The fossils are bryozoans
bryozoans

abundant fossils just below the
Prosopora horizon.

200 yds S. north of corner of Clay Evans.
on road road. bluff of east
side of road, 400 yds S. of Rolling Fork
at Pleasant Valley church

2 ft internal fossiliferous
Platystrophia, bryozoans

3 ft internal fossiliferous
Platystrophia, P. dentata, Septaria
bryozoans

3 ft 10 in fossiliferous internal

4 ft arg. hard ls. layers 4-5 inches
thick, with bryozoans, bryozoans

4 in arg. ls. with bryozoans, bryozoans

arg. ls. bryozoans

It is further West of Brighton, Ill.
about half a mile before reach-
ing the Dixonian. It is a
thin layer of ⁵in. or ⁶in. thick. It is
found 1 ft. 2 in. below
the top of the Black shale
and 1 ft. 6 in. above the
top of the Black shale.





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Vancouver,

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